

## XV. SOUTH AMERICAN CRICKETS, GRYLLOTALPOIDEA, AND ACHETOIDEA.

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As in the case of my four former papers on the Orthoptera of Brazil and surrounding portions of South America, published in these ANNALS, the present paper is based upon material belonging to the Carnegie Museum. The collections as a whole are rather rich in forms, and permit of a fairly comprehensive treatment of the South American orthopteran fauna. The present paper contains descriptions of a number of apparently new forms. While not presenting a complete synopsis of the crickets of South America, I have included a number of synoptical tables for the separation of families, genera, and in some instances of species as well.

There has been a tendency among systematic entomologists during the past few years to consider the orthopteroid insects as being of more than ordinal value. The present writer, as a result of a study of the group, shares this opinion. In a recent paper<sup>1</sup> he has given his views in a synoptical key or table compiled from several sources. This table is presented herewith and shows the relationships of the several groups of insects which he would include under the term "orthopteroid insects."

### SYNOPSIS OF THE ORDERS AND SUBORDERS OF ORTHOPTEROID INSECTS.

A. Tarsi normally five-jointed.

b. Cerci distinctly segmented or jointed.

c. Apterous, structure thysanuran. Eyes small, with few facets. Ovipositor of female exserted. Terrestrial, subterranean, dwellers among rocks in darkness [Alberta, Canada] . . . . . Order GRYLLOBLATTARIA.

cc. Normally winged, but frequently with those organs subobsolete or entirely missing. Structure not thysanuran. Ovipositor of female not exserted.

d. Eggs contained in a capsule, or oötheca, sometimes carried by the female. Insects not social. Species represented only by males and females.

<sup>1</sup> A Preliminary Catalogue of the Orthopteroid Insects of the Philippine Islands (University Studies, Vol. XV, No. 2, pp. 195-281, Lincoln, Neb., 1915.)

*c.* Body oval, depressed, much broader than deep at the posterior extremity of the prothorax. Head nearly horizontal and wholly, or almost wholly, concealed beneath the pronotum, the mouth posterior, or infero-posterior, when at rest; ocelli generally two in number. Pronotum clypeate, usually transverse. Legs depressed, rather lengthily and numerous spined. Insects of rapid movements. Oötheca chitinized, usually carried by parent.....Order DICTYOPTERA, or BLATTARIA.

*ee.* Body elongate, generally narrow, even when depressed or expanded but little broader than deep at the posterior extremity of the prothorax. Head free, often separated from the prothorax by a deep constriction; ocelli three or wanting. Pronotum never transverse, except occasionally by laminate expansions. Legs rarely depressed, the front pair constructed for grasping. Insects of deliberate movements. Oötheca membranous, not carried by parent, but attached to twigs, bark, or other objects.....Order MANTARIA.

*dd.* Eggs not contained in a capsule or oötheca. Insects social. Frequently constructing large and complicated nests. Species represented by males, females, workers, and warriors.

Order ISOPTERA.

*bb.* Cerci not segmented or jointed. Body normally elongate, narrow. Head subhorizontal, generally quadrate or gibbous; mouth antero-inferior; ocelli often wanting; antennæ usually longer than the body and coarse. Pronotum very short. Legs all constructed for walking. Eggs dropped singly and indiscriminately.....Order GRESSORIA.

*AA.* Tarsi normally four- or three-jointed, very rarely two-jointed. Stridulating organs and auditory apparatus often present.

*b.* Posterior legs constructed for jumping, much more robust and longer than the others. Organs of flight in a reversed position when immature. Head vertical, ovipositor with a few exceptions free or exerted.

Order SALTATORIA.

*c.* Antennæ generally much shorter than the body, filiform, clubbed or ensiform, the joints distinct, often depressed. Ocelli two or three. Tarsi three-jointed.

*d.* Anterior legs constructed for walking or clinging to vegetation, not fitted for burrowing. Tarsi similar in structure on all the legs. Stridulating organs located on the hind femora and costal field of front wings. Auditory apparatus situated on the sides of the basal abdominal segment. Ovipositor composed of four horny plates divergent at tip.....Suborder LOCUSTOIDEA.

*dd.* Anterior legs greatly modified for burrowing in the earth. Tarsi of the front pair of legs differing from those of the other pairs. Stridulating organs located on the tegmina or front wings. Auditory apparatus, when present, confined to the anterior tibiae. Ovipositor not exerted. Body of insect cylindrical. Antennæ variable, but not typically setaceous, as in the two following suborders.....Suborder GYRLLOTALPOIDEA.

cc. Antennæ much longer than the body, setaceous, delicately tapering. Stridulating organs, when present, situated on the anal field of the tegmina. Auditory apparatus situated near the base of the front tibiæ. Ovipositor usually prolonged into a compressed blade or needle, its parts compact.

d. Ocelli variable. Tarsi three-jointed, those of the front legs or else of the hind legs differing from the others in structure. The middle field of the tegmina in repose, like the anal field, nearly or quite horizontal; male tegmina (when present) furnished on the dorsal surface with a tympanum (very rarely absent) extending across both the anal and median areas, crossed by a prominent nervure formed by the main anal vein, and as a whole broader than the rest of the tegmen. Ovipositor (unless, as rarely, concealed) forming a nearly cylindrical straight or occasionally upcurved needle, the inner valves generally scarcely exposed except at the expanded tip. Suborder ACHETOIDEA.

dd. Ocelli generally wanting. Tarsi nearly always four-jointed, very similar in structure on all the legs. Middle field of tegmina in repose, like the costal field, nearly or quite vertical; base of the male tegmina (when present) furnished on the dorsal surface with a tympanum limited to the anal area, crossed by a prominent nervure formed by the last branch of the anal vein, and as a whole narrower than the rest of the tegmen. Ovipositor (unless, as rarely, concealed) forming a strongly compressed, generally ensiform blade, the inner valves almost always partially exposed the entire length of the ovipositor, the tip not expanded.

Suborder TETTIGONOIDEA.

bb. Posterior legs similar to the others, not constructed for jumping. Tarsi three-jointed. Organs of flight (when present) in a normal position. Ovipositor concealed by the subgenital plate. . . . Order DERMAPTERA.

c. Always apterous. Parasitic on mammals.

d. Eyes much reduced. Mandibles strongly flattened, not adapted to mastication, but the inner margin densely clothed with bristles. Cerci feebly chitinated, forming incipient forceps. Maxilla with the inner lobe furnished with two apical teeth (Malayan Archipelago). . . . Suborder ARIXENIA.

dd. Eyes absent. Mandibles normal. Cerci non-segmented, feebly chitinated, not horny. Inner lobe of maxilla with four apical teeth. Viviparous. (African). . . . Suborder HEMMERINA.

cc. Fully winged or apterous. The wings, when present, four in number, the anterior pair corneous, the hind pair membranous, complicately folded and tucked beneath the former. Not parasitic. Cerci modified into strongly chitinated horny forceps. Inner lobe of the maxilla provided with four apical teeth. Oviparous. . . Suborder FORFICULINA.

KEY FOR SEPARATING THE SOUTH AMERICAN FAMILIES OF ACHETOIDEA.

A. Tarsi compressed, the second joint minute.

b. Posterior tibiæ moderately robust.

- c. Posterior tibiæ biserially spinose.
  - d. The hind tibiæ armed with spines on both sides, the carinæ not at all serrated.
    - e. Hind tibiæ armed with long, movable, hairy spines. The posterior metatarsi unarmed above, or provided with but a single row of serrulations. . . . . *Nemobiidæ*.
    - ee. Hind tibiæ armed with heavy fixed spines, or in some instances spines partly movable. Head globose, or very gently depressed; the face vertical. The front between the antennæ neither swollen nor produced. The superior or upper claw of the hind tibiæ shorter than the middle one, or of equal length. Ocelli disposed in a triangle. Hind femora shorter than the combined length of the tibiæ and tarsi. . . . . *Achetidæ*.
    - dd. Posterior tibiæ on both sides of the basal portion serrated, of the apical portion spined. Tegmina either abbreviated or wanting. *Gryllomorpha*idæ.
  - cc. Posterior tibiæ usually biserially serrulate. Without spines on their lateral margins, but sometimes having them present in their middle towards the apex.
    - d. Body subspherical, apterous. Antennæ heavy, subfiliform. Hind femora enormous, dilated, oval. Eyes subobsolete, minute. Anterior tibiæ without auditory apparatus. Hind tibiæ without serration and provided above near their middle with several movable spines; apex with only three or four claws. . . . *Myrmecophilidæ*.
    - dd. Body subelongate. Antennæ slender, setaceous. Eyes distinct. Posterior femora more slender, clavate; hind tibiæ slender, provided at apex with six claws. Body covered with scales. In the females apterous, in the males provided with membranous tegmina. Anterior tibiæ sometimes provided with auditory apparatus. Hind tibiæ serrulate, not spinose, provided with elongate claws. *Mogopliis*idæ.
- bb. Posterior tibiæ slender, armed on the lateral edges with slender spines, between which the canthi are serrulate. Male tegmina with the speculum divided by one, two, or more, veins.
  - c. Apex of the posterior tibiæ provided with five claws; on the inside two, on the outside three. . . . . *Pentacentridæ*.
  - cc. Apex of the posterior tibiæ provided with six claws; three inside, three outside.
    - d. Head vertical, vertex short, mouth inferior or below. All the tibiæ armed with movable spurs. The male speculum of the tegmina (when developed) divided by two veins. . . . . *Phalangopsitidæ*.
    - dd. Head elongate, horizontal, mouth directed to the front. Pronotum slender, longer than wide, the lateral lobes narrowed anteriorly. Anterior and middle tibiæ without spurs. The speculum of the male tegmina divided by a single vein. . . . . *Æcanthidæ*.
- AA. Tarsi with the second joint depressed, heart-shaped.
  - b. Posterior tibiæ not serrated, biserially spinose, and provided on each side



with three movable spines; the apex sometimes furnished with two claws on the inner side. Female ovipositor short and curved; speculum of the tympanum of the male tegmina undivided. Size of insects small.

*Trigonidiidæ.*

*bb.* Posterior tibiæ usually, but not always, serrated, also spined on both sides, the apex furnished with three spurs on each side. Ovipositor straight or a very little curved; speculum of the tympanum of the male tegmina divided by one (or sometimes two) veins. Size of insects medium to large.

*c.* Claws of the posterior tibiæ elongate, the intermediate one on each side much longer than the upper. Metatarsi elongate. Pronotum anteriorly coarctate, the angles somewhat acute, lateral lobes oblique, in front angulate. Head robust or large, eyes prominent at sides; tegmina of moderate size and of the usual form, the lateral field bent down at right angle; in the males with the tympanum provided with two oblique parallel veins. Apex of the ovipositor furnished with lanceolate, acute, non-dentate valves. . . . . *Enecopteridæ.*

*cc.* Claws of the posterior tibiæ minute on the outer side, on the inner side rather long, the upper one longest and the lower one shortest. Metatarsi usually short, sparsely dentate basally. Ovipositor variable, cylindrical, apical valves dentate, or flattened.

*d.* Posterior tibiæ not at all serrulate, but armed on both edges with two sizes of spines. Insects large, their body and legs robust. Ovipositor heavy, its apical valves depressed and with its tip truncated. . . . . *Stenogryllidæ.*

*dd.* Posterior tibiæ both serrulate and spined. Insects variable in size, the body generally rather slender, with the legs variable. Ovipositor graceful, the apical valves not flattened, acuminate, or blunt, the margins dentate or crenulate. . . . . *Podoscirtidæ.*

#### KEY FOR SEPARATING THE FAMILIES OF THE SUBORDER GRYLLOLALPOIDEA.

*A.* Anterior tibiæ greatly dilated and digitate. Antennæ filiform, many-jointed. Head without, or provided with but two, large ocelli.

*b.* Antennæ setaceous, rather long. Elytra or tegmina membranous, in the male provided with a tympanum or stridulating surface. Pronotum elongate-oval. Tarsi three-jointed. Posterior legs small, saltatorial, the tibiæ somewhat dilated. Cerci long and setaceous. . *Curtillidæ.*

*bb.* Antennæ very short. Body linear, cylindrical. Elytra or tegmina almost absent. Posterior legs very short, non-saltatorial. Tarsi two-jointed. Cerci not apparent. Ocelli absent and the eyes small, ocelliform.

*Cylindrodidæ.*

*AA.* Anterior tibiæ little dilated, three- to four-spined at apex. Antennæ short, moniliform, composed of few joints. Posterior legs strongly saltatorial, the femora dilated; tibiæ slender, four-clawed at apex, tarsi single-jointed or aborted. Elytra corneous, without a tympanum. Head furnished with three ocelli. . . . . *Tridactylidæ.*

## SYNOPSIS OF THE SOUTH AMERICAN GENERA OF CURTILLIDÆ.

- A. Anterior tibiæ four-toed.  
 b. Posterior tibiæ provided with several spines on inner margin. [Old world and west coast of America.].....*Curtilla*.  
 bb. Posterior tibiæ without spines on inner margin, or seldom with a single small spine. [New world, except west coast].....*Neocurtilla*.  
 AA. Anterior tibiæ two-toed. [New World].....*Scapteriscus*.

## Genus CURTILLA Oken.

*Curtilla* OKEN, Lehrb. Nat., III, (1815), p. 445.

*Acheta* LINNÆUS (in part) Syst. Nat. (ed. X), I, (1758), p. 428.

*Gryllotalpa* LATREILLE, Hist. Nat. Crust. Ins., III, (1802), p. 275, and many others, until very recently.

The representatives of this genus of mole-crickets occur chiefly in the Orient. At least two species, however, are native to the American hemisphere, where they are confined to the region of the western coast. A third species, the oldest known, has been introduced by commerce to our cities on the eastern coast and possibly also to the principal South American seaports. The following key will aid in separating these three forms:

## SYNOPSIS OF AMERICAN SPECIES OF CURTILLA.

- A. Size large, 40 to 45 mm. in length. [Various sea-ports, introduced from Europe.].....*gryllotalpa* Linnæus.  
 AA. Smaller, 26 to 35 mm. in length.  
 b. Pronotum provided with a median fulvous line. Size 26-28 mm. [Chile] *chilensis* Saussure.  
 bb. Pronotum without a median fulvous line. Size 30-34 mm. [California, Mexico, and possibly to Isthmus of Panama].....*cultriger* Uhler.

I. *Curtilla cultriger* (Uhler).

- Gryllotalpa cultriger* UHLER, Proc. Ent. Soc. Philad., II (1864), p. 343; Scudder, Mem. Peabody Acad. Sci., I (1869), p. 23, Pl. I, figs. 13, 32, 33, etc.  
*Curtilla cultriger* KIRBY, Syn. Cat. Orth., II (1906), p. 6.

A single female specimen of this insect is at hand bearing the label "Fuerte, Sinaloa, Mexico, Mrs. Bissell." This specimen belongs to the Holland Collection in the Carnegie Museum.

## SYNOPSIS OF SOUTH AMERICAN SPECIES OF NEOCURTILLA.

- A. Process of the anterior trochanters large, more or less distinctly triangular in form.  
 b. Apex of the hind tibiæ armed with only four spines. Tegmina and wings well-developed.....*macilenta* Saussure.  
 bb. Apex of the hind tibiæ armed with six spines, three on each side. Tegmina very short, wings absent.....*minor* sp. n.

AA. Process of the anterior trochanters rather small, rounded.

b. Wings elongate, passing, or about reaching, the apex of the abdomen.

c. Wing extending beyond the apex of the abdomen. Color pallid, fulvous. Size medium, 30 mm. or more. [West Indies, Mexico, Central and South America].....*hexadactyla*<sup>2</sup> Perty,

cc. Wings about reaching the apex of the abdomen. Color dark fulvous. Size small, 23-26 mm. [Mexico, Central America, and West Indies]

*intermedia* Saussure.

bb. Wings abbreviated or missing, never reaching the apex of the abdomen. Tegmina of moderate length.

c. Larger, about 30 mm. Both sexes always provided with wings. Anterior tibiae with the dactyls moderately elongate. [West Indies]

*borealis* Burnmeister.

cc. Smaller, about 25 mm. The male usually without wings. Anterior tibiae with the dactyls short and obtuse. [Argentina]

*claraziana* Saussure.

## 2. *Neocurtilla minor* sp. nov.

Slender, minute, without wings, and with much abbreviated tegmina.

General color dark brown, the terminal tergites of the abdomen plainly longitudinally fasciate with testaceous on each side of the middle. Legs above paler than the almost uniformly colored pronotum, below and at base dirty testaceous or ochraceous. Claws of anterior tibiae and tarsi robust, piceous, the outer tibial claw longest, the inner shortest. Process of the anterior trochanters moderately large, roundly triangular, the lower margin studded with graduated tooth-like spines or bristles, the longest being at the apex; auditory apparatus large and prominent, elliptical, located above and back of the center of the first tibial dactyl at a distance equal to its longest diameter. Pronotum minutely velvety, elliptical, the center provided with a depressed longitudinal area, widest anteriorly; the front margin roundly emarginate. Head elongate, narrowing forward, the front quite prominently and angulately ridged from a little in advance of the ocelli to between the base of the antennae. Ocelli prominent, slightly transverse, the vertex between them transversely tumid. Eyes fairly prominent, one and one-half times as long as broad, the facets prominent. The hind legs scarcely saltatorial, the tibiae subfusiform.

Length of body, ♂ (?), 18 mm.; of pronotum, 5.5 mm.; width of pronotum, 4 mm.; length of tegmina, 4 mm.; of hind femora, 4.1 mm.

<sup>2</sup> *N. hexadactyla* var. *spinosa* Chopard has a single spine at the middle of the inner margin of the hind tibiae according to that author.

*Habitat*.—The only specimen at hand, the type, comes from Rio Mamoré, Bolivia, where it was taken "between the farm Berlin and Guaja Mirim, Sept. 16-24, 1909, by J. D. Haseman." This specimen is very imperfect, since it lacks both the antennæ and the cerci. It is by far the smallest representative of the genus as well as of the family thus far discovered. It is the property of the Carnegie Museum.

### 3. *Neocurtilla hexadactyla* (Perty).

*Gryllotalpa hexadactyla* PERTY, Del. Anim. Art. (1832), p. 119, Pl. 23, fig. 9; BURMEISTER, Handb. Ent., II (1838), p. 740; SCUDDER, Mem. Peabody Acad. Sci., I (1869), p. 27, Pl. 1, figs. 17, 37, 38.

var. *Gryllotalpa azteca* SAUSSURE, Rev. Zoöl. (2), XI (1859), p. 316.

*Gryllotalpa hexadactyla* var. *azteca* SAUSSURE, Miss. Mex., Orth., (1874), p. 345; Biol. Cent.-Amer. Orth. I (1894), p. 200.

*Neocurtilla hexadactyla* KIRBY, Syn. Cat. Orth., II (1906), p. 2.

*Habitat*.—This insect has a very wide distribution in tropical and subtropical America. Specimens are at hand from the following localities: Pará and Chapada, Brazil (H. H. Smith); Rio Grande, Bahia, Dec. 30, 1907, Lagoa Feia, Tocos, Espirito Santo, June 29, 1908, and Raiz de Serra, near Santos, São Paulo, July 26, 1908 (J. D. Haseman); Puerto Suarez, Bolivia, 150 M., Nov. 1908-Jan. 1909 (J. Steinbach). There is also a female specimen in the writer's collection taken at Rosario, Argentina, by H. Stempelmann.

In addition to the two species just referred to I find a single specimen of *N. borealis*, Burmeister, in the material now being studied. It bears the locality label "Pittsburg, Pa."

The species *N. claraziana* Saussure, is represented in the writer's collection, and was taken by him at Carcaraña, Argentina, during his visit to that country in 1897-8.

### Genus *SCAPTERISCUS* Scudder.

*Scapteriscus* SCUDDER, Proc. Bost. Soc. Nat. Hist. XI, (1868), p. 385; Memoirs Peabody Acad. Sci., I, (1869), p. 6; SAUSSURE, Miss. Mex., Orth. (1874), p. 336; Mém. Soc. Genève, XXV (1877), p. 36; GIGLIO-TOS, Boll. Mus. Torino, IX (1894), No. 184, p. 43.

The genus *Scapteriscus* is confined to the Americas, where it is represented by approximately a dozen species, most of which occur in South America. While there is a great variation among these distinct forms in size and length of wing, many of them are very similar in general appearance and rather difficult to determine. The annexed table will in a measure aid in their separation, although the characters here employed are rather superficial and not very structural in nature:

SYNOPSIS OF THE SOUTH AMERICAN SPECIES OF SCAPTERISCUS.<sup>3</sup>

- A. Tegmina covering more than one-half of the abdomen.
- b. Size very large (length 45-50 mm.). Color pale testaceous, the pronotum with an irregular discal fuscous patch. [Brazil, to Middle Argentina]  
*oxydactylus* Perty.
- bb. Size smaller (length 25-35 mm.) Color variable, but darker than in the alternate category.
- c. Size small, slender (25 mm.); pronotum less than 6 mm. in length; front trochanter with the lower outer apex angulate and produced downwards. [Brazil].....*tenuis* Scudder.
- cc. Size larger and more robust (28-35 mm.). Pronotum 7 mm. and upwards in length. Anterior trochanter with the blade variable, but never hooked or produced downwards at the apex.
- d. Tibial dactyls or fingers distant from each other at base by at least one-half the width of one of the dactyls.
- e. Edge of the bare blade on the lower border of the anterior trochanter rounded. Tibial dactyls separated by one-half the width of the lower one.
- f. Head, pronotum, dorsal edge, and upper half of the outer face of the hind femora rather heavily marked with fuscous. [Mexico, Central and South America, and West Indies]  
*didactylus* Latreille.
- ff. Head, pronotum, dorsal edge and upper half of the outer face of the hind femora less heavily blotched with fuscous. [Paraguay].....*camerani* Giglio-Tos.
- ee. Edge of the bare blade on the lower border of the anterior trochanter straight. Tibial dactyl separated by a space nearly equal to the width of the lower one.
- f. Apical segment of the hind tarsi strongly dilated, fully one-half as wide as long. Legs strongly and closely hirsute. [Mexico, Colombia, and Brazil].....*mexicanus* Burmeister.
- ff. Apical segment of the hind tarsi less strongly dilated, only about one-third as wide as long. Legs sparsely hirsute. [Paraguay, Argentina].....*borellii* Giglio-Tos.
- dd. Tibial dactyls or fingers almost, or quite, touching at their base.
- c. Tegmina covering nearly the whole abdomen. [Central and South America].....*vicinus* Scudder.
- ee. Tegmina covering not more than two-thirds of the abdomen. [Brazil and West Indies].....*agassizi* Scudder.
- AA. Tegmina covering only one-half of the abdomen or less.
- b. Tegmina one-half the length of the abdomen, the hind wings shorter than the abdomen, but one-half longer than the tegmina. Trochanter of front legs large, flattened, the sides parallel, rounded at the extremity. [Northern South America].....*variegatus* Scudder.

<sup>3</sup> An occasional depauperate individual of other species may be small, but still possess the structural features credited to those species.

*bb.* Tegmina less than one-half the length of the abdomen, the hind wings more or less aborted.

*c.* Wings not at all or barely passing the tegmina, the abdomen marked above with some regular pale spots. [Colombia]. . . *parvipennis* Serville.

*cc.* Wings abortive, not more than one-half the length of the tegmina. [Pernambuco, Brazil]. . . . . *abbreviatus* Scudder.

#### 4. *Scapteriscus oxydactyla* (Perty).

*Gryllotalpa oxydactyla* PERTY, Del. Anim. Art. (1832), p. 118, pl. 23, fig. 9; BURMEISTER Handb. Ent., II (1838), p. 74; SERVILE, Ins. Orth. (1839), p. 307.

*Scapteriscus oxydactylus* SCUDDER, Mem. Peabody Acad. Sci., I (1869), 7, pl. 1, figs. 2, 21.

*Scapteriscus oxydactyla* SAUSSURE, Miss. Mex., Orth. (1874), p. 337.

*Habitat.*—One female and one male specimen are before me. They come from Santa Cruz de la Sierra, Province del Sara, Bolivia, where they were taken in 1909 by J. Steinbach. There is also a female bearing the label "Cacequy, Rio Grande do Sul, Brazil, Feb. 2, 1909 (J. D. Haseman)." The writer also has specimens which were collected as far south as the city of Rosario, Argentina.

#### 5. *Scapteriscus borellii* Giglio-Tos.

*Scapteriscus borellii* GIGLIO-TOS, Boll. Mus. Torino, IX (1894), p. 45, figs. 12, 15;

KIRBY, Syn. Cat. Orth., II (1906), p. 1.

*Habitat.*—While there are no specimens contained in the collection now being reported upon, there are a number of specimens in the writer's possession. These were taken at various localities in Argentina, as well as at San Bernardino and Asunción, Paraguay.

#### 6. *Scapteriscus mexicanus* (Burmeister).

*Gryllotalpa mexicana* BURMEISTER, Handb. Ent. II (1838), p. 740.

*Scapteriscus mexicanus* SCUDDER, Mem. Peabody Acad., I (1864), p. 9, pl. 1, figs. 6, 18; SAUSSURE, Miss. Mex., Orth. (1874), p. 337; KIRBY, Syn. Cat. Orth., II (1906), p. 1.

*Habitat.*—Only a single male specimen of this species is at hand. It comes from San José, Costa Rica, where it was taken by P. Biolley. As shown by the synoptical key it and the preceding species are quite closely related.

#### 7. *Scapteriscus didactylus* (Latreille).

*Gryllotalpa didactyla* LATREILLE, Gen. Crust. Ins., XII (1804), p. 122; BURMEISTER, Handb. Ent., II (1838), p. 740.

*Scapteriscus didactylus* SCUDDER, Mem. Peabody Acad. Sci., I (1869), p. 10, pl. 1, figs. 1, 14; SAUSSURE, Miss. Mex., Orth. (1874), p. 338, pl. 8, fig. 20.

*Gryllotalpa tetradactyla* PERTY, Del. Anim. Art. (1832), p. 118, pl. 23, fig. 8.

*Habitat.*—There are several specimens at hand which are referred



to this species. They come from Corumbá and Pará, Brazil (H. H. Smith). A single small female (25 mm. in length) coming from "Dutch Guiana" (O. G. Schultz) is also referred here. A still more depauperate specimen (22 mm.) labeled "Santa Cruz de la Sierra, Prov. del Sara, Bolivia, 1909, J. Steinbach" may also belong to this species.

In the writer's private collection are specimens of *didactylus* taken in several of the West Indian Islands and various parts of South America.

#### 8. *Scapteriscus vicinus* Scudder.

*Scapteriscus vicinus* SCUDDER, Mem. Peabody Acad. Sci., I (1869), p. 12, Pl. 1, figs. 4, 23; KIRBY, Syn. Cat. Orth., II (1906), p. 2.

*Habitat*.—Specimens classified as this species bear the following labels: "Puerto Suarez, Bolivia, Nov., '08-Jan., '09 (J. Steinbach)," five females; "Sta. Cruz de la Sierra, Prov. del Sara, Bolivia," one female, also taken by J. Steinbach. The writer also possesses a single female specimen, which he took at Las Palmas, Chaco, Argentina, in 1897.

#### SYNOPSIS OF THE SOUTH AMERICAN GENERA OF TRIDACTYLIDÆ.

- A. Body smooth, punctate. Head directed anteriorly, narrowing towards the front; ocelli arranged in a transverse line. Middle tibiæ fusiform. Inferior anal appendages styliform. Wings nearly normal.
- b. Size usually more than 5.5 mm. long. Pronotum furnished with a delicate transverse, but well-defined sulcus near the middle of the anterior half. Front tibiæ of males sometimes deeply fissate; hind tibiæ with three or four pairs of long natatory lamellæ, preceded by slight serrations, and armed at the tip on either side with two very unequal calcaria, the longest scarcely longer than the metatarsus, the only member of the tarsus present.

#### *Tridactylus*.

- bb. Size usually less than 5.5 mm. in length. Pronotum without a well-defined transverse sulcus. Front tibiæ of male never fissate. Hind tibiæ with a single pair of natatory subapical lamellæ or none; the margins of the hind tibiæ usually, but not always, smooth, armed at the tip on either side with two very unequal calcaria, the longest about half as long as the tibiæ, the tarsus wholly wanting, or at least practically invisible. . . . . *Ellipes*.
- AA. Body velvety. Head vertical. Ocelli arranged in an arcuate line. Middle tibiæ slender. Inferior anal appendages compressed. Wings with the anterior field horny, smallest, the posterior field largest. . . . *Rhipipteryx*.

#### Genus TRIDACTYLUS Olivier.

*Tridactylus* OLIVIER, Enc. Meth., Ins., IV (1789), p. 26; LATREILLE, Hist. Nat. Crust., Ins., III (1802), p. 276; SAUSSURE, Rev. Suisse Zool., IV (1897), pp. 407-419 and authors in general to date.

*Xya* LATREILLE, Gen. Crust. Ins., IV (1809), p. 383; BURMEISTER, Handb. Ent., II (1838), p. 741, etc.

*Heteropus* PALISOT DE BEAUVOIS, Ins. Afr. Amer. (1805), p. 231.

The representatives of this genus are to be met with throughout the warmer parts of the earth, where they are confined to low wet places on the margins of streams, ponds, lakes, swamps, etc. They are strongly aquatic in habit, often swimming about on the surface of the water seemingly for the mere pleasure of it. At other times they burrow beneath the mud and wet sand as do representatives of the family Gryllotalpidæ. They are essentially herbivorous and may be collected by sweeping the grass and other vegetation growing about their haunts. They may be collected also on mud and wet sand when the weather is warm and the sun shines brightly. The number of forms of these little cricket-like insects appears to be much greater than published accounts would indicate, since there are many variations in size and color-markings among them, as taken in different regions, although these characteristics appear to be quite constant with the individuals in each of these localities.

Some of the characters which have been employed in separating these interesting little insects are such as general form, color, size, puncturation, presence or absence of spines or lamellæ on the hind tibiæ, form of anal segments of the abdomen, shape of anal appendages, or lamellæ, smoothness of body, etc. Although some of these characters seem to be indicative of groups rather than of species, it is quite a difficult matter to decide definitely as to their real value without a very careful study of the living insects from a number of localities.

Up to this time but few published references as to the actual occurrence of representatives of the genus exist for South American localities. Judging from material now at hand and the experience of the present writer while collecting orthopterous insects in several localities in Brazil, Paraguay, and Argentina, the conclusion might be arrived at that the reason for this absence of records of occurrence and of the insects themselves is largely due to the neglect of collectors rather than to the absence of the insects.

The forms which are separated by the annexed synoptic table occur in one or more of the South American countries. Undoubtedly some of the species, which have been taken and reported in Mexico, Central America, and the West Indies, will be found to occur in South America as well, but until that time they will not be included in this key.

## SYNOPSIS OF SOUTH AMERICAN SPECIES OF TRIDACTYLUS.

- A. Pronotum throughout quite closely and rather strongly punctate. Entire surface of the body and legs opaque or lusterless. General color deep black. Size medium (length of body, 7-8 mm.). . . . . *obscurus* sp. nov.
- AA. Pronotum and other portions of the body and legs glabrous, almost impunctate. General color variable. Size also variable (5-8 mm.)
  - b. Size larger and form moderately robust (7-8 mm.). Color pallid, but more or less variegated, the darker markings irregular and vague in their outline. [Bolivia, Paraguay, and Argentina] . . . . . *australis* sp. nov.
  - bb. Size smaller (4.75-5 mm.). Color darker, or at least with the darker markings definite and well-defined.
    - c. Form moderately robust. General color black, reminding of the much larger *obscurus*. [Brazil & Bolivia] . . . . . *atratus* sp. nov.
    - cc. Form rather slender. General color pallid, but with well-marked fuscous patches on the pronotum, tegmina, and legs. [Bahia, Brazil]. . . . . *politus* sp. nov.

9. *Tridactylus obscurus* sp. nov.

Rather above the medium in size, a very dark-colored, almost black, insect, the chief characteristic of which is its dull or opaque surface and the closely punctulate pronotum and front.

Head moderately large, the front between the antennæ broad and convex, closely and deeply punctate, the ocelli large and prominent, clypeus large, and with the apex broadly and evenly rounded. Pronotum without a well-defined transverse impressed line anteriorly. Tegmina broad, a little more than one-half the length of the abdomen, their apex broadly rounded. Wings lengthily caudate, reaching well beyond the apex of the hind femora and the tip of the abdominal appendages. Hind tibiæ provided with large natatorial appendages, the lateral canthi furnished with several large teeth or serrations and the superior claws strongly hooked at their apex. Last ventral segment broadly rounded at its apex, the preceding one a little broader than long, its apex bilobed (♀) or entire (♂). Anterior tibiæ broadly longitudinally canaliculate internally, the apex four-spined and somewhat fissate at its middle.

General color, as stated above, dull black, in some specimens showing a tendency towards variegation with pale markings on the tegmina and femora. Wings pallid, with the dorsal edge beaded with fuscous. Underside slightly paler, but still infuscated or tinged with fuscous.

Length of body ♀ & ♂, 7-8 mm. to tip of wings, 9.5-10.5 mm.

*Habitat*.—The type (♀) comes from Santarem, Brazil, where it was

collected by H. H. Smith. Other specimens also were taken at the same place. In addition to these there are some other specimens at hand coming from Corumbá, May, and Pedro Blanco, April (H. H. Smith), while a single specimen bears the label "Puerto Suarez, Bolivia, 150 M. Nov. '08-Jan. '09. (J. Steinbach)."

10. *Tridactylus australis* sp. nov.

About the same in size as the preceding, but differing from it in having the body glabrous and nearly impunctate, even on both the pronotum and the front between the eyes. General color smoky-white or pale flavous, with the sides of the pronotum, base of the tegmina, and outer face of the hind femora showing traces of clouded patches. Pronotum near its anterior part showing plainly the transverse impressed line mentioned in the synoptic table of genera. Apex of the clypeus broadly and roundly, or arcuately, emarginate. Last ventral segment of the abdomen of the female scoop-shaped, the apex rounded, entire; the preceding segment with its apex gently bilobed, a little more than twice as wide as long; in the male the apical segment, or subgenital plate, has the apex somewhat emarginate, and the preceding segment nearly, or quite, entire.

Length of body, ♂, 6.5 mm., ♀, 7.5 mm.; to tip of wings, ♂, 8 mm., ♀, 9.5 mm.

*Habitat*.—The types, ♂ & ♀ *in coitu*, come from Formosa, Chaco, Argentina, where they were taken by the writer in September, 1897. Other specimens are at hand from the same place, and still others come from Carcaraña and Cruz del Eje, Argentina, and San Bernadina, Paraguay. The Carnegie collection contains a specimen from the "Province del Sara, Bolivia, 450 M. (J. Steinbach)."

11. *Tridactylus atratus* sp. nov.

At first glance suggesting a diminutive of the *T. obscurus*, described in this paper, but upon examination found to be without the dull surface and puncturation so characteristic of that species.

Moderately robust, the front evenly rounded and provided with a few rather large punctures, the clypeus short, transverse, its apex truncate. Pronotum evenly rounded, without a very definite transverse impressed line in advance of the middle, the surface shining, provided with a few scattered punctures. Hind femora robust. Hind tibiae provided with natatory appendages and the carinae with

several fairly coarse teeth or serrations. Anterior tibiae somewhat similar to those described in *T. politus*. The apical segments of the abdomen rather hirsute, the subgenital plate with its apex widely emarginate, and the apex of the preceding segment entire, nearly truncate.

Length of body, 5.1 mm.; to tip of wings, 7 mm.

*Habitat*.—The type of this species comes from Puerto Suarez, Bolivia, where it was taken by J. Steinbach at an elevation of 150 meters above sea-level. There are also two other specimens at hand. One of these latter comes from Santarem and the other from Benevides, Brazil (July). These latter specimens were presumably taken by H. H. Smith. All three belong to the Carnegie Museum.

#### 12. *Tridactylus politus* sp. nov.

Small, slender, and of a pale ground-color with prominent markings of fuscous on the head, pronotum, tegmina, and middle and hind femora, and with a highly polished or glabrous surface.

Head of medium size, the front short, the clypeus narrowed anteriorly and with its apex roundly emarginate. Anterior portion of the pronotum showing a well-defined, slender, transverse, impressed line. Wings caudate, slender, extending fully one-fourth of their length beyond the tips of the hind femora and abdomen. Next to the last ventral segment of the abdomen of the male rather large, the outer or apical portion thickened, brunnaceous, and with the apex broadly rounded, entire; the last segment semimembranous, gently tapering, its apex truncate. Anterior tibiae short, quadridentate, the internal face widely channeled.

Length of body, ♂, 4.85 mm.; to tip of wings, 6.6 mm.

*Habitat*.—"Morro do Pará, on Rio San Francisco, Bahia, Brazil. Dec. 6, 1907, Haseman." The type and a second specimen bearing the same locality-label and date are deposited in the Carnegie Museum.

#### Genus *ELLIPES* Scudder.

*Ellipes* SCUDDER, *Psyche*, IX (1902), p. 309; BLATCHLEY, *Rept. Indiana Dept. Geol.*, XXVII (1903), pp. 410, 415; KIRBY, *Syn. Cat. Orth.*, II (1906), p. 11.  
*Heteropus* SAUSSURE (*nec*. Palisot de Beauvois), *Miss. Mex.*, *Orth.* (1873), p. 351; *Mém. Soc. Genève*, XXV (1877), p. 47; *Suisse Zoöl.*, IV (1896), p. 419; *Biol. Cent.-Amer.*, *Orth.*, I (1896), pp. 204, 207.

These little cricket-like insects are found in places similar to those

frequented by representatives of both the genera *Tridactylus* and *Rhipipteryx*. They seem to be most nearly related to the former, however, and have similar habits. While quite widely distributed over the warmer parts of the Americas, they do not seem to be as well known as the representatives of either of the above mentioned genera. Wherever found they occur rather abundantly. Possibly, if specially sought for, other species would be found. The characters employed in separating the forms are similar to those used in the two other genera just referred to. The following key is suggested as an aid in separating the South American species.

SYNOPSIS OF SOUTH AMERICAN SPECIES OF ELLIPES.

- A. Posterior tibiæ strongly toothed, the apical spurs hooked; metatarsi present.  
*denticulatus* Saussure.
- AA. Posterior tibiæ without teeth or spines, the apical spurs variable.
  - b. Metatarsi present, but abortive, not conspicuous. Hind tibiæ with their margins entire, bearing at the apex one to two movable spines.  
*histrío* Saussure.
  - bb. Metatarsi none.
    - c. Hind tibiæ at the apex on each side provided with a carinule which has the appearance of a styliform appendage not separated from the tibiæ.  
*histrionicus* Saussure.
    - cc. Hind tibiæ at apex without either natatory lamella or attached styliform carinules.....*minimus* sp. nov.

13. *Ellipes histrío* (Saussure).

*Tridactylus* (*Heteropus*) *histrío* SAUSSURE, Biol. Cent.-Amer., Orth., I (1896), p. 207.  
*Ellipes histrío* KIRBY, Syn. Cat. Orth., II (1906), p. 11.

*Habitat*.—The present collection contains specimens as follows: Chapada, Brazil, Jan. and May 4; Corumbá, May 2 (H. H. Smith collector); Puerto Suarez, Bolivia, 250 M., two (J. Steinbach).

These insects which are referred here seem to agree fairly well with the description of the species as characterized in the accompanying synoptical key. The movable spines near the apex of the hind tibiæ, one on one side and two on the other, are quite characteristic of it, as compared with representatives of the next species, which is entirely without either the spines or the natatory lamellæ, as well as the carinæ described in connection with the apex of the tibiæ of *E. histrionicus*.

14. *Ellipes minimus* sp. nov.

Related to *E. histrionicus*, but differing from it in lacking even the styliform attached carinæ, which characterize that species, when com-



pared with *histrío*, which latter, as indicated in the synopsis, has the apex of the hind tibiae provided with one to two movable spines, instead of natatory lamellæ as in *Tridactylus*.

Rather slender in general form, the folded wings extending fully one-fourth of their length beyond the apex of the abdomen in both sexes. General color rather dark, varied with flavous arranged in patterns much as in the other species of the genus. Penultimate segment of the female abdomen roundly triangulate, the last or apical segment subquadrate, narrowest at its tip, with the apical margin a little advanced at middle, rather heavily clothed with elongate robust hairs; these segments of the male abdomen are quite similar to those of the insect with which comparison is above made, but with the penultimate segment much shorter than in it.

Length of body, ♂, 3.15 mm., ♀, 4 mm.; length to tip of the wings, ♂, 4 mm., ♀, 4.7 mm.

*Habitat*.—The specimens at hand come from Chapada, Matto Grosso, Brazil, Jan., Mch, May (H. H. Smith); Jacaré, Minas Geraes, Brazil, Dec. 11, 1907 (J. D. Haseman).

The types, ♂ and ♀, are from Chapada. They are deposited in the Carnegie Museum.

#### Genus RHIPPTERYX Newman.

*Rhippteryx* NEWMAN, Ent. Mag., II (1834), p. 204; Brullé, Hist. Nat. Ins., IX (1835), p. 198; BURMEISTER, Handb. Ent., II (1838), p. 742) BLANCHARD, Hist. Ins., III (1840), p. 413.

*Rhippteryx* SERVILE, Ins. Orth. (1839), p. 316; SAUSSURE, Miss. Mex., Orth., V (1873), p. 354; Biol.-Cent. Amer., Orth., I (1896), p. 208, etc.

The representatives of the genus *Rhippteryx* are confined to the American tropics, where numerous species are known to occur. These insects are quite active and live mostly upon vegetation in damp localities similar to those frequented by the species of both *Tridactylus* and *Ellipes*. Unlike them, however, they do not burrow in the mud and damp sand, but live above ground, as do the grouse-locusts or Tetrigidæ among the Acridoidea or Locustoidea. These insects also seem to be rather closely related to the Locustoidea and particularly to the grouse-locusts in some of their structural characters as well as in their habits. This is especially true of the form of the ovipositor, which is composed of four toothed and hooked valves, which work in opposite directions when drilling for ovipositing.

Most of the species of the genus are confined to South American countries, where representatives of the group may be looked for at suitable localities from ocean to ocean and from the Isthmus of Panama to Bolivia, Paraguay, and northern Argentina. Since practically all of the described forms are from this continent, they will be included in the annexed synoptical key, which is given for the purpose of showing the relationships of the new forms described herewith.

So far as known the coloration and size of the different species are fairly constant, hence these characters will be largely employed in their separation.

## SYNOPSIS OF THE SPECIES OF RHIPIPTERYX.

## A. Larger species (9-14 mm. including wings).

## b. Entirely black, the claws of the hind tibiæ also black.

## c. Antennæ with the sixth antennal joint above yellowish white.

d. Length of the body to tip of the wings 9.2 mm. [Panama, on Volcano Chirique]. . . . . *carbonaria* Saussure.

## dd. Length of body including the wings only 8 mm. [Bogotá].

*atra* Serville.

## cc. Antennæ with most, or at least the apical, joints pallid in color. Metatarsus and claws unequal in length.

d. Three apical joints of the antennæ pallid, the remaining joints black, or infuscated. Length of the body including the wings 13 mm. [U. S. of Colombia]. . . . . *forceps* Saussure.

## dd. Two apical joints black, the remaining joints pallid. Length(?), [Department of Santa Cruz, Bolivia]. . . . . sp. nov.

## bb. Variegated with yellow or rufous. Claws of the hind tibiæ pallid.

## c. Disc of the pronotum immaculate, not marked with yellow or dirty white.

## d. Size smaller (10.5 mm. including the wings). First four of the antennal joints above pallid, the apical joint entirely and the penultimate one partly so. Metatarsus of the hind tibiæ of equal length with the claws. [Guiana, Brazil, and Central America].

*limbata* Burmeister.

## dd. Size larger (11.5-14 mm.). Metatarsi shorter than the claws.

e. Scutellum of the face flavo-bimaculate. Anterior and middle femora broadly bordered with, or entirely, flavous. Hind femora not bordered above with yellow. Size 11.5 mm. to tip of wings. [Nicaragua and S. America]. . . *hydrodroma* Saussure.cc. Scutellum of the face immaculate. Anterior femora entirely black, middle pair bordered below, hind femora bordered both above and below, with flavous. Size 12.5 mm. to 14 mm. to tip of the wings. [Tropical America]. . . *circumcincta* Saussure.

## cc. Disc of the pronotum largely pallid, or at least marked with this color.

## d. Pronotum for the most part pallid, or with the disc conspicuously dotted and marked with black.

- e.* Legs and tegmina also chiefly pallid. Length of body including the wings 13 mm. [Dept. Santa Cruz, Bolivia]. *. boliviana* sp. nov.
- ee.* Legs and tegmina largely fuscous, more or less strongly tinged with dull ferruginous. Pronotum conspicuously marked with large black patches.
- f.* Black patches of the pronotum three in number, one dorsal, the others lateral, separated by two broad anteriorly converging pallid bands reaching from the hind to front margins. Length including the wings 10 mm. [Pará, Brazil].  
*trilobata* Saussure.
- ff.* Black patches of the pronotum four in number, one on each side, one parallel to its anterior border, and the fourth dorsal, back of its middle, separated by two prominent decussating lines which cross just in advance of the middle of the disc. Length to tip of the wings 11 mm. [Cuyabá, Brazil].  
*cruciata* sp. nov.
- dd.* Pronotum largely black, the disc more or less prominently obliquely marked with flavous lines on each side. (Length of tip of the wings 10 to 13 mm.)
- e.* Body and legs rather heavily or widely marked with flavous or dirty white. Posterior metatarsus ovate-conical, entirely pallid in color or at least so apically, one-third shorter than the claws or spurs.
- f.* Smaller, 11–11.5 mm. to tip of the wings. Apical field of the wings more or less violet-tinged.
- g.* Tegmina pale-bordered throughout, the disc with a subcostal heavy longitudinal pale patch. Middle and hind femora pale-bordered both above and below. [Island of Trinidad; Colombia, Guiana]. *. rivularia* Saussure.
- gg.* Tegmina with their sutural margins and the apex pale-bordered and white-spotted. Hind femora pale-margined above. [Pará, Brazil]. *. marginata* Newman.
- ff.* Larger, 13 mm. to tip of the wings. Wings beyond the pallid transverse line shining violet in color. [Guianas, Venezuela, and Surinam]. *. cyanipennis* Saussure.
- ee.* Body and legs narrowly marked with flavous. Posterior metatarsus large, entirely black; wings with their apical field black, not at all violaceous. Length of body 9.2 mm.; to tip of the wings, 11 mm. [Chapada, Brazil]. *. brullei* Serville.
- AA. Smaller species (4.1 to 7.5 mm.).
- b.* Minute, black, or rufous, varied with flavous. Eyes moderately remote, at least as far apart as the width of one of them. Face between the antennal scrobes of the male with a transverse, swollen, yellow line. Posterior metatarsi somewhat elongate.
- c.* The flavous facial line of the male marked with three black impressions, or face plain black.

d. Pronotal disc marked with a rufous patch, or with a couple of anteriorly directed yellow lines.

e. Pronotum not yellow-bordered in front; disc with ferruginous patch.

f. Slightly smaller, color black. [Mexican plateau].

*mexicana* Saussure.

ff. Slightly larger, more or less varied with rufous; black, hind femora with the apex rufous, or of that color throughout. [Vera Cruz, Guatemala, and other portions of the low country in Mexico and Central America]. *fraterna* Saussure.

ee. Pronotum entirely yellow-margined.

f. Disc of the pronotum with an elongate ferruginous maculation. Size smaller, 6.2 mm. with wings. [Southern Mexico, Costa Rica]. . . . . *tricolor* Saussure.

ff. Disc of the pronotum furnished with two narrow strongly divergent yellow lines. Size larger, 7.5 mm. with the wings. [Chapada, Brazil]. . . . . *marginipennis* sp. nov.

dd. Pronotal disc immaculate, completely yellow-bordered. Color chiefly black. Size small, 6.5 mm. with the wings. [Costa Rica.]

*biolleyi* Saussure.

cc. The transverse facial line of the male roughly tumid, without the black impressions. Black, the pronotum completely yellow-bordered, provided with oblique discal margins. Length including the wings 7 mm. [Guererro, Mexico]. . . . . *scrofulosa* Saussure.

bb. Smallest, color dirty smoky-brown. Face between the antennæ of both sexes flat. Eyes close together, separated by a space scarcely more than one-fourth the width of one of them. Posterior metatarsus very short. Size to tip of the wings 4.1 mm. [Lower Mexico; Peru].

*pulicaria* Saussure.

### 15. *Rhipipteryx forceps* Saussure.

*Rhipipteryx forceps* SAUSSURE, Biol. Cent.-Amer., Orth., I (1896), p. 201, Pl. II, fig. 23; KIRBY, Syn. Cat. Orth., II (1906), p. 11.

*Rhipipteryx atra* SAUSSURE (*non* Serville), Miss. Mex., Orth. (1874), p. 361.

The collections now being reported upon contain two specimens, which seem to belong here, rather than to either *R. atra* Serville or *R. carbonaria* Saussure, both of which are also reported as occurring in Colombia. As indicated in the foregoing synopsis of species, the pallid joints of the antennæ do not agree with the descriptive matter, where the insects are more fully described.

*Habitat*.—Bogotá, Colombia. Carnegie Museum, Acc. No. 2306.

### 16. *Rhipipteryx* sp.?

There are two immature specimens of a second entirely black *Rhipipteryx* at hand coming from the Upper Mamoré river, Dept. of

Santa Cruz, Bolivia, at an elevation of 1,200 meters above sea-level, where they were taken by Steinbach during the month of December, 1913. They form part of Accession No. 5016. These insects, while immature, show that they are quite distinct from the three known black forms, since the antennæ are all white except the two apical joints which are black. Their extreme southern habitat, together with the entire absence of records of similar forms from intervening localities seems to point to their distinctness. These insects are likewise preserved in the entomological collections of the Carnegie Museum.

17. *Rhipipteryx circumcincta* Saussure.

*Rhipipteryx circumcincta* SAUSSURE, Miss. Mex. (1874), p. 358; KIRBY, Syn. Cat. Orth., II (1906), p. 12.

*Habitat*.—Four specimens are at hand. Three of them come from Benevides, Brazil, where they were taken by H. H. Smith during the month of July, and the fourth bears the label "Pará." It was also collected in July and presumably by H. H. Smith.

18. *Rhipipteryx boliviana* sp. nov.

Almost the maximum in size for the genus. A very striking insect in appearance, since it is prevaillingly dirty white or pale gray in color. The pronotum is marked with dashes and dots of black to the number of eight as follows: a longitudinal, large wedge-shaped line, the point in front, on the middle of the disk, extending from near the hind margin a little more than halfway towards the front; a moderately large transverse elliptical patch on each side, about midway between the posterior and anterior margins; and a series of five patches parallel to the anterior edge, the one in the middle a mere dot, the others larger. Anterior tibiae rather broadly and deeply sulcate on their inner face. Last ventral abdominal segment of the abdomen of the male black, elongate, prow-shaped, with the apex finely acuminate, preceded by a raised keel, on the sides of which are two roundish protuberances. Cerci, or what seem to be such, white, with dusky apex, rather long, slightly enlarged apically, and rounded, the lower apical edge provided with a long, slender, black spine. A second, but much slenderer and shorter, pair of stylets in advance of these, black. Abdominal segments very broadly white-margined. Legs dirty white, except for the infuscated knees and somewhat darkened apex of the

middle and hind tibiae. Posterior metatarsus and tibial claws white, the former slender, about two-thirds as long as the claws. Antennae with the two basal joints entirely pallid, the next three pallid above, and the upper side of the sixth narrowly streaked lengthwise with same color; lower sides of the third to the sixth, and all of the remaining segments black. Tegmina with the sutural half pallid, the other half infuscated. Wings with their costal margin pale, tinged with violet, the remainder pale metallic blue with mother-of-pearl or iridescent reflections.

Length of body, ♂ and ♀, 8.5 mm.; including the wings, 12.5-13 mm.

*Habitat*.—The three specimens at hand all come from the "Upper Mamoré River, Department of Santa Cruz, Bolivia, 200 M." They were taken by Steinbach. The types, ♂ and ♀, belong to the Carnegie Museum.

#### 19. *Rhipipteryx trilobata* Saussure.

*Rhipipteryx trilobata* SAUSSURE, Miss. Mex., Orth. (1874), p. 357; KIRBY, Syn. Cat. Orth., II (1906), p. 12.

*Habitat*.—Three specimens of a *Rhipipteryx* which are referred to this species, come from Pará, Brazil, where they were taken during the months April and July, by H. H. Smith. They belong to the Carnegie Museum.

#### 20. *Rhipipteryx cruciata* sp. nov.

Reated to *R. trilobata*, but somewhat larger and more robust, and with the black of the pronotum separated into four tracts by two decussating pallid lines, which extend from the sinus of one side to the opposite lower anterior angle. Head comparatively large, the eyes also large but not prominent, bordered by a pallid line; occiput marked by two rufotestaceous lines converging behind, the posterior ends of which are hidden by the front edge of the pronotum. Pronotum large, wide, rather broadly bordered with pallid, and having the disc crossed diagonally with two prominent lines of the same color in such a manner as to break up the black ground-color into four patches, the largest almost circular and situated dorsally back of the middle, the two lateral spots central, triangular, with their apices directed upwards, the anterior spot fairly wide, continuous, parallel with the anterior border, widest dorsally and reaching from near the



lower edges. Antennæ with joints one to six largely pallid. Anterior tibiæ strongly infuscated; knees and apex along with the tarsi of the middle legs and knees and most of the tibiæ of the hind legs also infuscated; posterior metatarsus and tibial claws pale testaceous, the former elongate-elliptical, moderately heavy, and rather closely fringed below with strong elongate hairs, nearly three-fourths the length of the claws. Hind femora marked with a narrow longitudinal line on the outer disc of each. Tegmina dimly banded with ferruginous and fuscous. Wings with the apical portion black. Abdomen black, the apices of the segments rather widely pallid; the apical segments similar to those in *trilobata*, but a trifle more robust.

Length of body, ♀ (?), 9 mm.; including the wings, 11.5 mm.

*Habitat*.—The only specimen at hand, the type, comes from Cuyabá, Brazil, where it was taken by H. H. Smith, in February. In the Carnegie Museum.

The pallid portions of this insect, except where otherwise stated, are ferrugineo-testaceous.

## 21. *Rhipipteryx rivularia* Saussure.

*Rhipipteryx rivularia* SAUSSURE, Biol. Cent.-Amer., Orth., I (1896), p. 212, pl. 11, fig. 20; KIRBY, Syn. Cat. Orth., II (1906), p. 12.

*Habitat*.—While the collections now being studied do not contain specimens of the above species, there are several examples of it in the author's collection which were taken on the Island of Trinidad. This record, therefore, establishes a wider distribution for the species. Specimens have also been seen by me which were taken in British Guiana.

## 22. *Rhipipteryx brullei* Serville.

*Rhipipteryx brullei* SERVILLE, Ins. Orth. (1839), p. 318; SAUSSURE, Miss. Mex., Orth. (1874), p. 357; Biol. Cent.-Amer., Orth., I (1896), p. 211, Pl. 11, fig. 21; KIRBY, Syn. Cat. Orth., II (1906), p. 12.

*Rhipipteryx marginatus* BRULLÉ, Hist. Nat. Ins., IX (1835), p. 198 (*non* Newman). *Tridactylus marginatus* PERCHERON, Gen. Ins. Orth. (1834), Pl. 1.

*Xya notata* BURMEISTER, Handb. Ent., II (1838), p. 742.

*Habitat*.—The collection contains a large series of this species, which were taken during June by H. H. Smith. They come from Chapada, near Cuyabá, Matto Grosso, Brazil.

The variation in both size and color is very little, even less than is usually to be observed in other species which are known to adhere closely to the type-form.

23. *Rhipipteryx marginipennis* sp. nov.

Related to *R. mexicana* and its allies, but with the pale markings on the disc of the pronotum similar to those of *brullei*, *marginata*, and *rivularia*.

Head of moderate size, the eyes with, or without, pale border on the surrounding portions of the face. Antennæ with the basal and three apical segments black, the second to the seventh segments largely pallid. Pronotum entirely and broadly pale-bordered, the disc furnished with two narrow anteriorly divergent lines. Middle femora pale-bordered below; the hind pair similarly bordered both above and below; the genicular area of the latter, except the lobes, which are largely black, tinged with dull ferruginous; the anterior tibiæ and the apex of the front femur tinged with fusco-ferruginous; hind metatarsus about as long as the tibial claws, gently acuminate. Tegmina and folded wings with their dorsal edge conspicuously pale-margined. Abdomen black, without pale margins on the apex of the segments. Tip of the abdomen rather simple.

Length of body of both male and female, including wings, 8 mm.

*Habitat*.—The collection contains two specimens, a male and a female, respectively, bearing the labels "Chapada, Nov." and "Chapada, April." There is also an immature specimen at hand which I am inclined to place here. It has the hind femora largely ferruginous and lacks the divergent pale lines on the disc of the pronotum. This latter specimen bears the label "Chapada, Matto Grosso, H. H. Smith, Acc. 2966."

24. *Rhipipteryx pulicaria* Saussure.

*Rhipipteryx pulicaria* SAUSSURE, Biol. Cent.-Amer., I (1896), p. 215, pl. II, fig. 24;

KIRBY, Syn. Cat. Orth., II (1906), p. 13.

*R. pulicaria* var. *peruviana* SAUSSURE, l. c., p. 216; KIRBY, l. c., p. 13.

There are at least seventy-five specimens of what seems to be Saussure's *R. pulicaria*. This material comes from a number of localities in Brazil, Bolivia, and even from the Island of Trinidad. There is quite a wide range of variation among these specimens so far as color is concerned, as well as some in size. Specimens coming from Chapada and Corumbá, Brazil, were taken during nearly every month of the year by H. H. Smith; some were collected at Puerto Suarez, Bolivia, by J. Steinbach, while others bear the label "Jacoré, Minas Geraes, Brazil, Dec. 11, 1907," and were collected by Haseman. The

specimens coming from the Island of Trinidad are in the writer's collection, and were taken by H. D. Chipman. Saussure based the species on specimens coming from various points in warmer Mexico, and separated others from Peru as a variety which he called *peruviana*. I myself have taken it both in Mexico and Costa Rica.

Should all of these specimens belong to a single species, and they certainly seem to me to do so, as I have hastily compared them, this would give quite a wide range for it.

### Family NEMOBIIDÆ.

This family has a world-wide distribution, and contains a large number of small to medium-sized insects.

#### SYNOPSIS OF THE SOUTH AMERICAN GENERA OF NEMOBIIDÆ.

- A. Posterior metatarsus not sulcate nor serrate. Anterior tibiæ provided with an auditory opening on their outer side. Median vein of the tegmina undivided.
  - b. Male tegmina furnished with a tympanum. Front slightly convex, but not rostrate. Hind tibiæ provided on each side beyond the middle with four long movable pubescent spines and their apex with six distal spurs.
 

*Nemobius* Serville.
  - bb. Male tegmina without a tympanum. Front somewhat tuberculate between the bases of the antennæ. Hind tibiæ provided on each side with only three movable pubescent spines and the apex with five spurs, three external and two internal. . . . . *Hygronemobius* Hebard.
- A.A. Posterior metatarsus slightly depressed, gently sulcate and serrate on the outer margin. Front tibiæ with the auditory opening on the inner face. Median vein of the tegmina branched. . . . . *Hemigrillus* Saussure.

### Genus NEMOBIUS Serville.

*Nemobius* SERVILLE, Ins. Orth. (1839), p. 345; FISCHER, Orth. Eur. (1853), p. 183; SAUSSURE, Miss. Mex., Orth. (1872), p. 380; Mém. Soc. XXV (1877), p. 68; Biol. Cent. Amer., Orth., I (1897), p. 221, and many others.

There are several other generic names which have been given to members of the genus, but these need not be mentioned here. (See Kirby, Syn. Cat. Orth., II, p. 14.)

Representative of the genus *Nemobius* are very widely scattered over the surface of the earth. In fact they occur on most of the continents and many of the islands within the temperate and tropical zones. The species are most numerous in tropical regions. Many of the species possess both long- and short-winged forms, and some also

vary considerably in size and color. Several of the species are aquatic, or at least semiaquatic, in habit.

The present collection contains only a small number of South American species. Possibly several of these are new and accordingly are described herewith. A table for separating all of the forms known to occur on this continent would undoubtedly be of considerable value to future workers, but until more material is available for the purpose I deem it hardly advisable to attempt the compilation of such a synoptical table. In August, 1913, Mr. Morgan Hebard published a revision of the species of the genus found in North America north of the Isthmus of Panama (*cf.* Proc. Acad. Nat. Sci. Philad., June, 1913). That very carefully prepared paper will be of much assistance in a similar study of the South American species.

25. *Nemobius meridionalis* sp. nov.

A medium-sized, smooth-bodied or glabrous insect, with prominent white spots on the upper edges of all the femora. The ovipositor is short and straight, much shorter than the hind femora, and its apex is evenly and finely serrated above. The tegmina are variable but somewhat shorter than the abdomen, the wings when present are caudate and greatly surpassing both the cerci and the tip of the ovipositor. Prothorax narrower in front than behind, with a well-defined humeral pale band; below this the sides are piceous, while the lower edge is broadly pale; disk somewhat conspersed with paler. Occiput more or less plainly pale quadrivittate. Head a little wider than the front edge of the pronotum, the eyes rather prominent.

General color above piceous, varied more or less on the pronotum and below with pale testaceous in some specimens, the humeral angle and costal area of the tegmina are varied with a greenish tinge. The tibiae are fasciate with light and dark, and the tarsal joints have their apices dark. Hind femora pale brown and testaceous, their upper edges prominently tripunctate with dirty white, these light-colored markings being located just beyond stiff dark-colored hairs or bristles. The third dorsal abdominal segment before the apex is provided on each side with a large white spot.

Length of body, 9 mm.; of pronotum, 1.5 mm.; of tegmina, 4-5.25 mm.; of wings when present 19 mm.; of hind femora, 7 mm.; of ovipositor, 4.5 mm.

*Habitat*.—Two females, one macropterous, the other brachypterous, coming from Don Diego (100 ft. above sea level), Dept. of Magdalena, Colombia, were collected by H. H. Smith.

Whether or not the present species has the aquatic habits described in connection with the following one, the writer cannot say.

26. *Nemobius aquaticus* sp. nov.

Very closely related to the preceding species both in size and color, but differing from it in never being macropterous so far as the material at hand would indicate. It also differs from *meridionalis* in having longer and heavier posterior femora, in being more robust, in having a heavier ovipositor, which is very gently bent downwards, instead of with a similar upward apical curve, as in the type of that species. It possibly is only a form of *meridionalis*.

Length of body, ♂, 9.5 mm.; ♀, 10.5 mm.; of pronotum, ♂, 1.75 mm., ♀, 2 mm.; width of same, ♂, 2.9 mm., ♀, 3 mm.; length of tegmina, ♂ and ♀, 6 mm.; of hind femora, ♂, 7 mm., ♀, 8 mm.; of ovipositor, 4.5 mm.

*Habitat*.—Very abundant among the floating aquatic plants growing in the Rio de la Plata and along its margins in pools at Buenos Ayres where it was collected during the summer of 1898. It had the habit of very commonly diving below the surface when pursued, and remained hidden among the floating plants for several minutes at a time before again venturing into the air to jump and run about on the stems and leaves of the aquatic plants, which afforded it protection. It also readily took to the open water and swam freely, as if this were a regular pastime.

27. *Nemobius longipennis* Saussure.

*Nemobius longipennis* SAUSSURE, Miss. Mex., Orth. (1874), p. 383; KIRBY, Syn. Cat. Orth., II (1906), p. 20.

*Habitat*.—A number of specimens of a rather large macropterous *Nemobius* in the material now being reported upon are referred to *longipennis* of Saussure. This reference has been made after a comparison with several specimens obtained in Argentina, which appear definitely to be Saussure's species. The material at hand comes from the following localities: Puerto Suarez, 150 M., Santa Cruz de la Sierra, 450 M., and Provincia del Sara, Bolivia, 450 M. (J. Steinbach); Corumbá, lowland, March, and Rio San Laurengo near Corumbá

(H. H. Smith); and lastly Moro do Pará, Rio S. Francisco, Bahia, Brazil, Dec. 6, 1907 (Haseman).

As is the case with some of the other *Nemobii* this species also varies somewhat in both color and size.

#### 28. *Nemobius brasiliensis* (Walker).

*Argizala brasiliensis* WALKER, Cat. Derm. Salt. B. M., I (1869), p. 61.

*Nemobius brasiliensis* SAUSSURE, Mém. Soc. Genève, XXV (1877), p. 87; KIRBY, Syn. Cat. Orth., II (1906), p. 19.

*Nemobius (Argizala) brasiliensis* HEBARD, Proc. Acad. Nat. Sci. Philad., 1913, pp. 403, 446-449, figs. 17, 18.

*Habitat*.—Specimens of this magnificent species are at hand from Rio Paraguay and Concepción, Paraguay, Santa Cruz de la Sierra, Province del Sara, and Puerto Suarez, Bolivia. Most of these were taken by J. Steinbach. They vary somewhat in color and also in size, but all readily run to this species as given in the synoptic key by Hebard, *l. c.*, p. 403.

There is a single additional male at hand from Corumbá, Brazil, which I believe also belongs with this species, although it is rather more robust and lacks the hind wings. In size and a few of its other general characteristics it does not differ greatly, but in color it is of a darker hue, and it also lacks much of the coating of strong bristles on the head and pronotum, so characteristic of *brasiliensis*, though these might have been rubbed off, thus giving to it a smoother appearance. At first I was inclined to refer it to *N. major* of Saussure, but, since this last named insect is said to resemble the *N. fasciatus* De-Geer, I have decided that it can hardly be Saussure's species. Presumably when a sufficient series of specimens of *Nemobius* are at hand from the various South American countries the relationships of these varied forms can better be determined.

#### 29. *Nemobius argentinus* sp. nov.

Very closely related to *N. brasiliensis* Walker, with which it agrees in most of its characteristics both as to color and large size. The main difference, however, is in its much shorter and more robust ovipositor. Length of body, ♂, 10 mm., ♀, 12 mm.; of pronotum, ♂, 1.6 mm., ♀, 1.9 mm.; of tegmina, ♂, 6 mm., ♀, 7 mm.; of wings, ♂, 14 mm., ♀, 16 mm.; of hind femora, ♂ and ♀, 7 mm.; of ovipositor, 4.35 mm.



*Habitat*.—The types, ♂ and ♀, come from Carcaraña, Argentina. A number of other specimens were taken at the same place. It was also attracted to lights at Rosario, about thirty miles east of Carcaraña.

This insect very likely is aquatic, as is the species *aquaticus*, described on a preceding page in the present paper.

30. **Nemobius cubensis** Saussure.

*Nemobius cubensis* SAUSSURE, Miss. Mex., Orth. (1874), p. 384, pl. 7, fig. 5; Biol. Cent.-Amer., Orth., I (1897), p. 222; SCUDDER, Journ. N. Y. Ent. Soc., IV (1896), p. 105; BLATCHLEY, Rep. Indiana Dept. Geol., XXVII (1903), pp. 420, 425.

*Nemobius (Neonemobius) cubensis* HEBARD, Proc. Acad. Nat. Sci. Philad., 1913, pp. 403, 455-468, figs. 22-24.

For additional synonymy see Hebard, *l. c.*

*Habitat*.—Specimens of what are determined as this species are at hand from the following localities: Los Indios, Isle of Pines, W. Ind., 1 ♀, taken during 1912 by G. Link; Don Diego (100 ft.) Dept. Magdalena, Colombia, S. A. (H. H. Smith) 1 ♀; a single ♂ from Piedra Blanca, Brazil, in April (H. H. Smith); 1 ♂, 3 ♀♀, Puerto Suarez, Bolivia, 150 M., 1 ♂, Santa Cruz de la Sierra, Bolivia, 450 M. and 1 ♂ and 2 ♀♀ Province del Sara, Bolivia, 350 M. (J. Steinbach). One of these latter was taken in December, 1912.

The above localities would indicate a fairly extended distribution for the species in South America as well as for North America as shown in Hebard's paper referred to above. The specimens examined in the series now at hand also show considerable variation in size and some little in structure as well.

31. **Nemobius** sp.?

There is a single male specimen before me from Chapada, Brazil, which appears to be distinct from *N. cubensis*, but I hesitate to refer to it as a distinct species with a separate name. Like two or three other specimens of *Nemobius* referred to in the present report this individual lacks hind wings, hence may not be typical of the species to which it belongs. It was collected during July by H. H. Smith.

32. **Nemobius chapadensis** sp. nov.

A very dark-colored rather small-sized and slender insect, in which the distoventral spurs of the hind tibiae are of slightly unequal length.

Apparently without hind wings and with the tegmina of the female about three-fourths of, and of the male equal to, the abdomen in length. Ovipositor robust, a little shorter than the hind femora, with a gentle upward curve, the apex having the superior margin not obliquely subtruncate, rather sharply serrate, the immediate apex not very finely pointed.

General color dark piceous varied on the occiput, gena, legs, humeral angle of tegmina, and venter with some streaks and patches of dull testaceous, most apparent in the male. Front and pronotum provided with a number of moderately strong spine-like black bristles. Head a little wider than the anterior margin of the pronotum; eyes large and prominent, the front and occiput evenly, but not greatly, convex. Pronotum considerably wider than long, the sides gently rounded, the apex but little narrower than the base; the hind margin straight ( $\sigma^7$ ) or a little sinuose ( $\varphi$ ).

Length of body,  $\sigma^7$ , 5.7 mm.,  $\varphi$ , 7.25 mm.; of pronotum,  $\sigma^7$ , 1.15 mm.,  $\varphi$ , 1.35 mm.; width of pronotum,  $\sigma^7$ , 2 mm.,  $\varphi$ , 2.25 mm.; length of tegmina,  $\sigma^7$ , 4 mm.,  $\varphi$ , 3.5 mm.; of hind femora,  $\sigma^7$  and  $\varphi$ , 5.5 mm.; of ovipositor, 4 mm.

*Habitat*.—The pair of insects upon which the present species is based come from "Chapada, May" ( $\varphi$ ) and "Chapada, near Cuyabá, Matto Grosso, Brazil, June" ( $\sigma^7$ ) where they were taken by H. H. Smith. They belong to the Carnegie Museum.

### 33. *Nemobius amazonus* sp. nov.

A small smooth-bodied insect, which at first glance recalls one of the smaller species of *Miogryllus* in its general appearance, but upon closer inspection shows its Nemobine relationships. It also shows some relationship to *Hygronemobius* in the venation of the tegmina of the male, but has the four movable spines on the two lateral canthi of the hind tibiae of *Nemobius*.

Head small, about equal in width ( $\varphi$ ) or slightly more ( $\sigma^7$ ) than the anterior portion of the pronotum. Eyes of moderate size and prominence, the front gently convex, in the two sexes about equal in width to the longest diameter of one of the eyes. Pronotum a little wider than long, with the sides gently rounded, the hind and front edges about equal in width ( $\varphi$ ), or about one and two-thirds wider than long, with the sides divergent towards the base ( $\sigma^7$ ), in both

sexes with a prominent longitudinal depressed line. Tegmina of male almost, those of female about two-thirds, the length of the abdomen. Wings lengthily caudate, fully twice the length of the tegmina, pallid. Hind femora about normal, neither excessively robust, nor noticeably slender. Hind tibiae armed with four movable spines on each margin, these spines only moderately hirsute, the basal ones rather small, the others gradually increasing in length. Ovipositor moderately robust, very gently upwardly curved, the superior margin of its apex rather coarsely toothed. Cerci rather robust, in the female about twice the length of the ovipositor.

Color of head and pronotum black, tegmina and legs fuscous varied with testaceous; the hind femora with two well-defined pallid spots on their upper edge, underside pallid, the apical joints of the palpi dirty white.

Length of body, ♂, 6 mm., ♀, 7.75 mm.; of pronotum, ♂, ♀, 1.25 mm.; width of pronotum, ♂, 2.3 mm., ♀, 1.75 mm.; length of tegmina, ♂, 4.5 mm., ♀, 4 mm.; of wings, ♂ and ♀, 9 mm.; of hind femora, ♂ and ♀, 4.15 mm.; of ovipositor 3 mm.

*Habitat*.—The types, a male and a female, come from Santarem, Brazil (H. H. Smith). They are the property of the Carnegie Museum.

#### Genus HYGRONEMOBIUS Hebard.

*Hygronemobius* HEBARD, Ent. News, XXIV (1913), p. 451; Ent. News, XXVI (1915), pp. 193-199, Pl. VI.

The representatives of this genus appear to be confined to the tropical and subtropical portions of the Americas. Heretofore five species have been recognized, and now a sixth is added. They differ from representatives of the genus *Nemobius* as indicated by the generic synopsis of the Nemobiidae given on a previous page. The six species may be separated by the following key:

#### SYNOPSIS OF THE SPECIES OF HYGRONEMOBIUS.

- A. Size large (10 mm.). Tegmina of female about one-half the length of the abdomen; hind wings caudate. [Pará].....*basalis* Walker.
- AA. Size small or medium (7.5 mm. or less). Tegmina of female variable, but generally minute, lateral; hind wings either wanting or caudate.
  - b. Form compact, head and pronotum stout, wings absent.
  - c. Maxillary palpi dark. General color dark brown, maculate with a still darker shade.
  - d. Dorso-internal spur of the hind tibiae equalling the metatarsus in

- length. Tegmina of male covering two-thirds of the abdomen, of female minute, lateral pads almost concealed by the pronotum. Ovipositor with the dorsal margin of its apex finely serrulate. [Bahamas, Florida].....*alleni* Morse.
- dd. Dorso-internal spur of the hind tibiae reaching four-fifths of the distance to the apex of the metatarsus. Tegmina of male covering all but the extreme apex of the abdomen, of female very small lateral pads. Ovipositor with the apex unarmed. [British Guiana].....*liura* Hebard.
- cc. Maxillary palpi white.
- d. Male, 5.5-6 mm.; female 7.5 mm. Apex of the last joint of the maxillary palpi broadly, and ventral margin of same narrowly, marked with black. Tegmina of male covering two-thirds of the abdomen, their apex sharply and transversely truncate, tegmina of female squamiform, lateral. Dorso-internal spur of the hind tibiae about three-fourths as long as the metatarsus. [Brazil; Galapagos].....*dissimilis* Saussure.
- dd. (Male, 4.75 mm., female, 5.5 mm.) Tip of the apical joint of the maxillary palpi white. Tegmina of male about one-half the length of the abdomen, their apex broadly rounded; tegmina of female squamiform, lateral. Dorso-internal claw of hind tibiae reaching almost four-fifths the distance to apex of metatarsus. [Brazil].  
*minutipennis* sp. nov.
- bb. Form slender, the head and pronotum proportionately small; wings very long. Maxillary palpi white. Dorso-internal tibial spur reaching two-thirds of the distance to the apex of the metatarsus, these members all very delicate. Tegmina about one-half the length of the abdomen. (Length of body, male and female 5-5.4 mm.) [British Guiana and Brazil].  
*albipalpus* Saussure.

#### 34. *Hygronemobius minutipennis* sp. nov.

Size small, the form compact, or robust. Maxillary palpi rather large, entirely whitish, the terminal segment well expanded apically. Pronotum of the male as in this sex of *dissimilis*, that of the female proportionately longer. Tegmina of the male about one-half the length of the abdomen, broadly rounded at apex, the veining very similar to that of these members in *H. liura* Hebard. Wings absent. The tegmina of the female small, lateral, having their apical edge strongly and obliquely truncate, on their costal margin reaching to the apex of the second abdominal segment. Spines of the hind tibiae robust, rather long, slightly alternating on opposite margins; the inner superior spur reaching between three-fourths and four-fifths of the distance to the apex of the metatarsus. Ovipositor with its



apex on both margins without teeth. General color as in *dissimilis*, *i. e.*, dark brown varied with paler patches, blotches, and specks; the legs, especially the tibiæ and tarsi testaceous, annulated with dark brown and piceous.

Length of body, ♂, 4.5 mm., ♀, 5.2 mm.

*Habitat*.—The types, a male and a female, are labelled "Piedra Blanca" and "April," as are three other specimens, a male and two nymphs. There is, however, an additional very imperfect male which was taken at Corumbá, Brazil. All of the specimens were collected by H. H. Smith. These insects are the property of the Carnegie Museum.

### 35. *Hygronemobius albipalpus* (Saussure).

*Nemobius albipalpus* SAUSSURE, Melang. Orth., II (1877), Fasc. V, p. 257; Mém. Soc. Genève, XXV (1877), p. 89; KIRBY, Syn. Cat. Orth., II (1906), p. 19.

*Hygronemobius albipalpus* HEBARD, Ent. News, XXVI (1915), p. 198, pl. VI, figs. 4, 4A, 4B.

*Habitat*.—There are two females of this species among the material collected by H. H. Smith at Santarem, Brazil. They agree well with Saussure's characterization of the species.

### Genus *HEMIGRYPUS* Saussure.

*Hemigrillus* SAUSSURE, Mém. Soc. Genève, XXV (1877), p. 100; KIRBY, Syn. Cat. Orth., II (1906), p. 20.

This genus seems to be monotypic and is confined to South America, where it is not at all rare, if we are to judge from the material at hand. It also has a fairly extended distribution.

### 36. *Hemigrillus kriegbaumeri* Saussure.

*Hemigrillus kriegbaumeri* SAUSSURE, Mém. Soc. Genève, XXV (1877), p. 101, pl. 12 (viii), figs. 1-6.

*Habitat*.—Originally described from Brazil. There are now before me specimens coming from the following localities: Pará, July (H. H. Smith); Santa Anna, Rio São Francisco, Bahia, Brazil, Dec. 1, 1907 (Ilaseman); Isla de Carropote in Rio São Francisco, 150 miles from Joazeiro, Bahia, Brazil, Dec. 3, 1907 (J. D. Haseman); and Santa Cruz de la Sierra, Bolivia, 450 M.; Las Juntas, Dept. Santa Cruz, Bolivia, 250 M.; and Province del Sara, Bolivia, 350 M., Feb., Oct., Dec. (J. Steinbach).

## SYNOPSIS OF THE SOUTH AMERICAN GENERA OF ACHETIDÆ.

- A. Posterior tibiæ with the inner upper spur distinctly longer than the middle one. Ocelli arranged in a triangle. Ovipositor rudimentary.  
*Anurogryllus* Saussure.
- AA. Posterior tibiæ with the inner upper spur of equal length or shorter than the middle one. Ocelli variable. Ovipositor not rudimentary, fully developed.
- b. Anterior tibiæ furnished with auditory openings on both margins; the external one larger and oblong, the internal smaller, circular.
- c. Species larger. Tegmina of the female with the dorsal areoles rhomboidal, in the male the tympanum is provided with three to four oblique veins.
- d. Ocelli placed in a transverse row. Body, pronotum, and limbs comparatively smooth, almost bare. Lateral lobes of the pronotum nearly quadrate. [Chiefly Old World forms.] *Acheta* Fabricius.
- dd. Ocelli placed in a triangle. Body, pronotum, and limbs hirsute or pilose. Lateral lobes of the pronotum more or less strongly oblique. [Distribution quite general]..... *Gryllus* Linnaeus.
- cc. Species smaller. Tegmina of the female with the dorsal areoles quadrate; in the male the tympanum is sometimes provided with two oblique veins..... *Miogryllus* Saussure.
- bb. Anterior tibiæ without an auditory opening internally. The tegmina frequently greatly abbreviated..... *Gryllodes* Saussure.

## Genus ANUROGYLLUS Saussure.

*Anurogryllus* SAUSSURE, Mém. Soc. Genève, XXV (1877), p. 283; KIRBY, Syn. Cat. Orth., II (1906), p. 23.

This is exclusively an American genus, unless we include the *A. australis*, which is credited to Australia, and its representatives are confined to the tropical and subtropical portions of both North and South American countries. According to Kirby's Catalog there are an even half dozen species. The females are noted for the entire absence, or great abbreviation, of the ovipositor. The males, if we are to judge from the single species known quite well to the author, *A. clarazianus* Saussure, are among the noisiest of the crickets. Only a single species is recognized among the material at hand.

37. *Anurogryllus clarazianus* (Saussure).

*Gryllodes clarazianus* SAUSSURE, Miss. Mex., Orth. (1874), p. 412, Pl. 8, fig. 31.

*Anurogryllus clarazianus* SAUSSURE, Mém. Soc. Genève, XXV (1877), p. 285; KIRBY, Syn. Cat. Orth., II (1906), p. 24.

*Habitat*.—Chapada near Cuyabá, Matto Grosso, Brazil, one male taken in March (H. H. Smith); Prov. del Sara, Bolivia, 350 M. and 450 M. December (J. Steinbach), two males, two females.



This species occurs in both brachypterous and apterous individuals so far as the hind pair is concerned. When provided with wings these organs nearly always are fully developed and lengthily caudate. Possibly all are winged at first, but lose them later in combat or by accident. These crickets dwell in perpendicular burrows of several inches in depth which they evidently construct for themselves. At Carcaraña, Argentina, they were collected just before dusk when the males were readily located by the loud and continued shrilling they made as they sat at the mouths of their burrows.

#### Genus *ACHETA* Fabricius.

*Gryllus Acheta* LINNÆUS, Syst. Nat. (ed. X), I (1758), p. 428.

*Acheta* FABRICIUS, Syst. Ent. (1775), p. 279; KIRBY, Syn. Cat. Orth., II (1906), p. 24.

For additional synonymy see Kirby, *l. c.*

While the present genus belongs to the Old World, at least one of the species, *A. bimaculata* DeGeer, is known to be almost or quite generally distributed over the entire oriental region as well as in portions of the New World, whither it has been carried by commerce. No representatives of this insect are at hand, but the present writer remembers having seen specimens in one or more South American collections, which were labeled as coming from the immediate vicinity. As memory serves, the collections containing such specimens were in Rio de Janeiro and Buenos Aires.

#### Genus *GRYLLUS* Linnæus.

*Gryllus* LINNÆUS, Syst. Nat., Ed. X (1758), p. 425; and most entomological writers since, especially SAUSSURE, Miss. Mex., Orth. (1874), p. 391; Mém. Soc. Genève, XXV (1877), p. 144 for S. American forms.

*Acheta* FABRICIUS (in part), Syst. Ent. (1775), p. 279.

Representatives of the genus *Gryllus* occur throughout the temperate and tropical countries and islands of the earth. According to Kirby (see Syn. Cat. Orth. II, pp. 27-38) one hundred and ten distinct species are recognized. These insects are usually moderately large and dark-colored. They live for the most part on the ground, in which they burrow, or crawl beneath stones, sticks, pieces of bark, boards, chips, and other protecting objects. Usually these insects live in pairs, but sometimes singly, or at other times socially. A few of the North American forms have been considered agricultural pests, since

they have the habit of gathering in grain shocks where they have been known to gnaw the bands of twine which hold the individual sheafs of grain together and thus render its handling difficult and more expensive.

The characters used for the separation of the various species are such as size, length of wing, length of ovipositor, comparative size and form of head and pronotum, and the size and form of the hind femora, together with the venation of the tegmina of the males.

About eighteen species have been recorded from the Antilles and South American countries. Only a very small proportion of these seem to be represented by the material now being reported upon. No synoptical key for the separation of the South American forms will be given on that account, but the reader is referred to the special papers of Saussure above cited.

### 38. *Gryllus abbreviatus* Serville.

*Gryllus abbreviatus* SERVILLE, Ins. Orth. (1839), p. 335; SCUDDER, Bost. Journ. Nat. Hist., VII (1862), p. 427; GLOVER, Ill. N. A. Orth. (1872), Pl. 9, figs. 10, 11; SAUSSURE, Miss. Mex., Orth. (1874), p. 400; Mém. Soc. Genève, XXV (1877), p. 149; and others.

For synonymy see Kirby, Syn. Cat. Orth., II (1906), p. 35.

*Habitat*.—There seems to be a female of the present species at hand from the Island of Jamaica, W. I. It belongs to the Carnegie Museum Accession No. 2306.

Three other short-winged crickets are among the material now being studied. Two of these, male and female, come from Chapada and Pará, Brazil (H. H. Smith), and the other, a female, from the Province del Sara, Bolivia, 350 M. (J. Steinbach), October, 1913. However, these latter have the ovipositor but 15 mm. long, and may be brachypterous specimens of *G. assimilis*.

I may add that the present status of our knowledge of the American species of this genus is rather vague. We know but little concerning the amount of variation in size, color, form of head, pronotum, length of wing and ovipositor which may be found to exist in these insects. In order to reach satisfactory conclusions a very large series of specimens is necessary from a wide extent of territory. The habits also of the living insects should be considered when such a study is taken up.

39. *Gryllus argentinus* Saussure.

*Gryllus argentinus* SAUSSURE, Miss. Mex. (1874), p. 399; Mém. Soc. Genève, XXV (1877), p. 152; KIRBY, Syn. Cat. Orth., II (1906), p. 37.

*Habitat*.—There is a single male specimen of a *Gryllus* at hand, which I refer to this species. It comes from Tucuman, Argentina, where it was taken October 19, 1912, by W. J. Holland. A female from the Province del Sara, Bolivia, may also belong here. It is quite pale in its general color.

This species is also reported to occur in Paraguay and Brazil. In fact, there are three female specimens in the present collection from Pará, which I have so labeled, although with some doubt as to the correctness of the determination. The length of the ovipositor (14-15 mm.) seems to agree better with the measurements given for *assimilis*.

40. *Gryllus assimilis* Fabricius.

*Gryllus assimilis* FABRICIUS, Syst. Ent. (1775), p. 280; OLIVER, Encl. Meth., VI (1791), p. 634; BURMEISTER, Handb. Ent., II (1838), p. 733; SAUSSURE, Miss. Mex. (1874), p. 396, Pl. 8, figs. 27-29; Mém. Soc. Genève, XXV (1877), p. 150, Biol. Cent.-Amer., Orth. I (1897), p. 226, Pl. 11, fig. 20.

For further synonymy see Kirby, Syn. Cat. Orth., II, p. 37.

*Habitat*.—This is without doubt the most abundant and widely distributed species of the genus in tropical America. It is known to occur in most of Mexico, in Central America, in the West Indies, and in South America to Bolivia, Paraguay, and northern Argentina. Specimens are at hand from Cuba and the Isle of Pines, West Indies, Bahia, Brazil, and from Puerto Suarez, Sta. Cruz de la Sierra and Province del Sara, Bolivia.

Genus *MIOGRYLLUS* Saussure.

*Miogryllus* SAUSSURE, Mém. Soc. Genève, XXV (1877), p. 194; Biol. Cent.-Amer., Orth. I (1897), p. 227; SCUDDER, Psyche, IX (1901), p. 256; KIRBY, Syn. Cat. Orth. I (1906), p. 38.

The representatives of the present genus are American and are to be found in the countries of North and South America between the fortieth parallels of latitude. At least a dozen species have been recognized and described, fully half of which belong to, or probably occur in, the region of which this paper treats.

Owing to the different characters used by authors in their descriptions, it seems rather difficult to make a practical synoptical key for

their ready separation. Hence none will be attempted at this time. These small crickets very likely agree fairly well with the members of *Gryllodes* and *Gryllus* in their haunts and habits.

The following listed species appear to be represented among the material at hand.

41. *Miogryllus pusillus* (Burmeister).

*Gryllus pusillus* BURMEISTER, Handb. Ent., II (1838), p. 733; SAUSSURE, Mém.

Soc. Genève, XXV (1877), p. 194; Pl. 12 (XI), figs. 7, 7e, f.

*Gryllodes pusillus* SAUSSURE, Miss. Mex., Orth. (1874), p. 416, Pl. 7, fig. 6.

*Miogryllus pusillus* SAUSSURE, Biol. Cent.-Amer., Orth., I (1897), p. 227; KIRBY, Syn. Cat. Orth. II (1906), p. 38.

*Habitat*.—There are two males and one female in the collection made by H. H. Smith at Santarem, Brazil. I also find another male bearing the label "Chapada, Brazil, Acc. No. 2966." This last insect was taken in October. The species is also recorded from Mexico, Guiana, Peru, etc., showing a rather wide distribution.

42. *Miogryllus micromegas* (Saussure).

*Gryllodes micromegas* SAUSSURE, Miss. Mex., Orth. (1874), p. 418.

*Gryllus micromegas* SAUSSURE, Mém. Soc. Genève, XXV (1877), p. 196.

*Miogryllus micromegas* SAUSSURE, Biol. Cent.-Amer., I (1897), p. 227; KIRBY, Syn. Cat. Orth., II (1906), p. 39.

*Habitat*.—Two females of still another species of this genus are referred here. One of them comes from "Bom Jesus de Lapa, Rio São Francisco, Brazil," where it was taken Dec. 8, 1907, by Haseman. The other is labeled "Prov. del Sara, Bolivia, 350 M. J. Steinbach, II, 1913."

43. *Miogryllus brevipennis* (Saussure).

*Gryllodes brevipennis* SAUSSURE, Miss. Mex., Orth. (1874), p. 418.

*Gryllus brevipennis* SAUSSURE, Mém. Soc. Genève, XXV (1877), p. 195.

*Miogryllus brevipennis* SAUSSURE, Biol. Cent.-Amer., Orth. I (1897), p. 227; KIRBY, Syn. Cat. Orth., II (1906), p. 39.

*Habitat*.—I find a pair of these little crickets which I place with Saussure's *M. brevipennis*. They come from Santa Cruz de la Sierra, Bolivia, at an altitude of 450 meters above sea-level, and were taken by J. Steinbach. They belong to Accession No. 4546.

These little crickets resemble representatives of the genus *Gryllodes*, but have both sides of the anterior tibia perforated, a character belonging to *Miogryllus*.

## Genus GRYLLODES Saussure.

*Grylloides* SAUSSURE, Miss. Mex., Orth. (1874), p. 409; Mém. Soc. Genève, XXV (1877), p. 197; Biol. Cent.-Amer., Orth. I (1897), p. 228; etc.

As indicated in the Synopsis of Genera of South American Achetidæ, the representatives of the genus *Grylloides* differ from those of other genera chiefly in the absence of an auditory opening on the inner margin of the front tibiæ. Most of the species also have greatly abbreviated tegmina and wings, especially in the females. They are rather solitary in habit and live both in shallow burrows or beneath stones, chips, pieces of bark, sticks, etc., preferring open, moderately dry, or well drained slopes to flat, damp localities. Ten or a dozen species have been recorded from the region embraced in the present paper. Representatives of but four of these are at hand.

44. *Grylloides sigillatus* Walker.

*Gryllus sigillatus* WALKER, Cat. Derm. Salt. B. M., I (1869), p. 46.

*Grylloides sigillatus* SAUSSURE, Mém. Soc. Genève, XXV (1877), p. 210.

*Gryllus pustulipes* WALKER, Cat. Derm. Salt. B. M., I (1869), p. 51.

*Grylloides pustulipes* SAUSSURE, Mém. Soc. Genève, XXV (1877), p. 210.

*Grylloides poeyi* SAUSSURE, Miss. Mex., Orth. (1874), p. 420, pl. 7, fig. 8; Mém. Soc. Genève, XXV (1877), p. 219.

*Habitat*.—A pair of this species are before me, which were taken at Los Indios, Isle of Pines (G. Link, collector). It has also been recorded from most of the other West Indian islands, a number of Mexican, Central and South American localities, the Hawaiian Islands, Australia, and some of the East Indian islands as well. It is evidently a species of the sea coast which has been spread by means of commerce and drifting vegetation.

45. *Grylloides parvipennis* Saussure.

*Grylloides parvipennis* SAUSSURE, Miss. Mex., Orth. (1874), p. 419; Mém. Soc. Genève, XXV (1877), p. 216; KIRBY, Syn. Cat. Orth., II (1906), p. 43.

*Habitat*.—Two female specimens are referred here. One comes from Santarem, Brazil (H. H. Smith), the other bears no locality-label, but is dated July. It was probably taken by the same collector and at the same place.

46. *Grylloides macropterus* sp. nov.

About the same in size and general color as *G. laplatæ* Saussure, but with fully developed tegmina and excessively elongated wings and

ovipositor, the latter extending somewhat beyond the apex of the hind legs when fully straightened out. Wings only a little shorter.

Form moderately robust, somewhat resembling a small *Gryllus* in general appearance, but lacking the perforation on the inner side of the anterior tibiae, and having the areoles of the dorsal portion of the tegmina in the female quadrate, instead of rhomboidal, as in *Acheta* and *Gryllus*. Head shining black, moderately large, subrotund, of about the same width as the anterior edge of the pronotum. Front about twice the shorter diameter of one of the eyes, the latter not prominent, a little elongate up and down; the ocelli arranged in an arcuate line, the lateral ones rather large and prominent. Front provided with an inverted broadly Y-shaped testaceous marking, the upper extremity of the shank of which reaches a point on a level with the center of the base of the antennæ. Occiput provided with six prominent testaceous lines. Genæ and mouth-parts pallid, the palpi dirty white, or pale testaceous. Pronotum somewhat pubescent, nearly twice as broad as long, the sides gently rounded, the anterior margin widely and evenly emarginate, the hind margin somewhat sinuose; the disk dark brown and rather prominently varied with testaceous, the lateral lobes having the superior portion piceous, the inferior portion pallid. Tegmina complete, almost reaching the apex of the abdomen, the humeral angle and the costal area pallid, the remainder fuscobrunneous. Legs testaceous, the hind femora embrowned. Wings pallid, lengthily caudate, extending fully three-fifths of their length beyond the tip of the tegmina. Ovipositor slender, filiform, excessively long.

Length of body, ♀, 12 mm.; length of pronotum, 2.5 mm., width, 4.5 mm.; length of tegmina, 8 mm., of wings, 20.5 mm., of hind femora, 10 mm., of ovipositor, 15 mm.

*Habitat*.—The type, a female, and the only specimen at hand, comes from Bahia, Brazil, west of Jacobina on road to Catinga, Nov. 10, 1907 (Haseman). It is in the Carnegie Museum.

#### 47. *Gryllodes argentinus* sp. nov.

The present writer possesses a male and three females of another macropterous *Gryllodes* which were taken at Carcaraña, Argentina. These insects are slightly larger and a little more robust than the female *G. macropterus* just described. They are also somewhat darker-



colored and lack much of the testaceous maculation of that species. The ovipositor is shorter and the wings somewhat less caudate.

Length of body, ♂ and ♀, 14 mm.; of pronotum, ♂, 2.25 mm., ♀, 2.50 mm., width, 4.5 mm.; length of tegmina, ♂ and ♀, 8 mm.; length of wings, ♂, 19 mm., ♀, 20 mm.; of hind femora, ♂, 8.5 mm., ♀, 9.75 mm.; of ovipositor, 10.5 mm.

*Habitat*.—As stated above, these insects come from Carcaraña, Argentina, where they were taken at lights.

#### 48. *Grylloides laplatæ* Saussure.

*Gryllus laplatæ* SAUSSURE, Miss. Mex., Orth. (1874), p. 408.

*Grylloides laplatæ* SAUSSURE, Mém. Soc. Genève, XXV (1877), p. 215; KIRBY, Syn. Cat. Orth., II (1906), p. 43.

*Habitat*.—There are several specimens of this insect at hand in the present writer's collection from both Rosario and Carcaraña, Argentina.

Possibly this and the two preceding are representatives of a single very variable species, which has a wide distribution over South America. The present form and *G. argentinus* described here agree in length of ovipositor.

#### Family GRYLLOMORPHIDÆ.

The insects, which have been relegated to the present family, occur chiefly in the Orient. Two genera, however, have representatives in South American countries. *Odontogryllus* with two species from Peru and Ecuador and *Zoara* with a single species from Jamaica. None of these appear to be among the specimens now being reported upon.

#### Family MYRMECOPHILIDÆ.

The crickets which comprise this family are found fairly well-distributed over the temperate and subtropical countries of the earth. They very likely also occur in the tropics, but thus far have not been collected. These insects are all small, some of them even minute, wingless, and quite delicate in structure. As the name implies, they live with ants, in the nests of which they are to be looked for.

The material at hand does not contain any representatives of the family, and so far as the present writer is aware, but a single species, *Myrmecophila americana* Saussure from Colombia is recorded as occur-

ring in South American territory. However, if we may judge by the numbers of species and the diversity of form and habits characterizing the ants belonging to the neotropical fauna, we most assuredly have a right to surmise that at least several additional species of *Myrmecophila* will ultimately be found in other portions of South America.

#### Family MOGOPLISTIDÆ.

The representatives of the family of Mogoplistidæ are all rather small crickets, which have their bodies more or less clothed with scales. These insects are widely spread over the warmer countries of the globe. Already eleven genera are known and upwards of fifty species. The group so far as North American territory is concerned has comparatively recently been carefully studied by Messrs. James A. G. Rehn and Morgan Hebard (*see* Proc. Acad. Nat. Sci. Philad., 1912, pp. 184-234, figs. 1-28).

A single native specimen of the family is at hand.

#### 49. *Cryptoptilum antillarum* (Redtenbacher).

For a very full synonymy of the species see Rehn and Hebard, *l. c.*, pp. 196-201, figs. 5-8.

*Habitat*.—A ♀ from Blue Hills, Nassau, Bahamas (W. W. Worthington). This insect was taken in January, 1909.

In addition to the above recorded insect there is a very imperfect nymph before me from "20 miles east of Bom Jesus da Lapa, Bahia, Brazil" where it was taken December 8, 1907, by Haseman. It is further marked by the Carnegie Museum Accession No. 3765.

#### Family PENTACENTRIDÆ.

The small family Pentacentridæ, so far as known, is represented in America only by a single genus and one species, viz., *Nemobiopsis gundlachi* Bolívar, from the island of Cuba. This family is characterized as shown in the synopsis of families on a preceding page. The material at hand for study does not contain representatives of the group.

#### Family PHALANGOPSITIDÆ.

This is an extensive family composed of numerous genera, the representatives of which are distributed over the warmer countries of the earth. A dozen or more of the genera have representatives in

South American regions. They may be separated by the subjoined key:

SYNOPSIS OF THE SOUTH AMERICAN GENERA OF PHALANGOPSITIDÆ.

- A. Pronotum wider than long, its lateral lobes quadrate, or rounded, or even angulated, but not narrowed in front.
  - b. Lateral lobes of the pronotum quadrate, the lower margin horizontal. Front between the antennæ broad, not rostrate, the posterior ocelli distant from each other. Hind femora somewhat shortened, the apex not slender.
    - c. Tegmina of the male fully developed, the tympanum complete, the speculum triangular, divided by two veins. Pronotum with the lateral lobes distinctly quadrate.
      - d. Anterior tibiæ with an auditory opening on each side. The median vein of the tegmina branched.....*Lerneca* Walker.
      - dd. Anterior tibiæ with an auditory opening only on the inner side. Tegmina with the median vein not branched, simple.
        - Prosthacusta* Saussure.
    - b. Lateral lobes of the pronotum oblique, rounded or angulate, the lower margin ascending towards the rear. Front between the antennæ narrow, sometimes narrowly rostrate.
      - c. Hind femora mediocre, gradually attenuated, the apical portion somewhat heavy, not filiform.
        - d. Anterior tibiæ without an auditory opening. Body of the female apterous (male also without wings).....*Laranda* Walker.
        - dd. Anterior tibiæ with distinct auditory openings. Tegmina of male with the speculum divided by many veins.
          - e. Rostrum of the front very narrow; the posterior ocelli rather close together. Anterior tibiæ with openings on both sides (sometimes almost closed externally). Posterior metatarsus carinate, uniseriately serrate. (Upper inner spur of the hind tibiæ deformed.).....*Paragryllus*<sup>4</sup> Guérin.
          - ee. Rostrum of the front narrow; the posterior ocelli less closely situated. Front tibiæ with the auditory opening on the outer side. Posterior metatarsus sulcate, biseriately serrulate. The spurs normal.....*Ectecous* Saussure.
      - cc. Legs longer. Hind femora swollen at the base, the apex slender.
        - d. Anterior tibiæ provided with auditory openings.
          - e. Rostrum of the front very narrow; the posterior ocelli very near together. (Speculum divided by two veins or triangular, not divided).
          - f. Anterior tibiæ furnished with foramina on both sides.
            - g. Rostrum of the front triangular, the anterior ocellus located on its apex in front. Tegmina corneous, without veins above. Both sexes winged.....*Amusus* Saussure.

<sup>4</sup> *Luzara* Walker also runs here. Whether distinct or not I cannot say.

gg. Rostrum of the front variable, the anterior ocellus located on its apex above. Tegmina of the males membranous, provided with a tympanum. Legs greatly elongate.

h. Posterior tibiæ with two internal spurs almost equal in length. Lateral lobes of the pronotum broadly rounded. Head rounded, the rostrum turned down in front. Female apterous. *Dyscophogryllus* Rehn.

hh. Posterior tibiæ with the upper internal spur much shorter than the median. Lateral lobes of the pronotum more angulate. Front narrowly rostrate. Female apterous. Tegmina of male abbreviated, discoidal. Pronotum arched, the lateral lobes angulated. Posterior femora elongate.

*Amphiacusta* Saussure,

ff. Anterior tibiæ provided with a single auditory opening and this on the inner side.

g. Upper inner spur of the hind tibiæ shorter than the middle one.....*Endacusta* Brunner.

gg. Upper inner spur of the hind tibiæ longer than the middle one.....*Endecous* Saussure.

dd. Anterior tibiæ without auditory openings. Legs very long, spider-like. Anterior femora not serrulate.

e. Upper internal spur of the hind tibiæ of equal length with, or longer than, the median. Tegmina of the male minute, the tympanum rudimentary. Female apterous.

*Phalangopsis* Serville.

ee. Upper internal spur of the hind tibiæ shorter than the middle one.

*Arachnomimus* Saussure.

AA. Pronotum somewhat elongate, its lateral lobes narrowing anteriorly, the lower margin ascending towards the front.....*Cophus* Saussure.

### Genus LARANDA Walker.

*Laranda* WALKER, Cat. Derm. Salt. B. M., I (1869), p. 88; KIRBY, Syn. Cat. Orth. II (1906), p. 64.

*Larandus* SAUSSURE, Mém. Soc. Genève, XXV (1878), p. 409.

The members of the present genus, so far as we know, are confined to tropical American regions where they live on the ground among fallen leaves and other dead and decaying vegetation. They are moderately large insects, with characters such as are indicated in the synopsis of genera given on a preceding page. Only a comparatively few species are known.

### 50. *Laranda tibialis* Walker.

*Laranda tibialis* WALKER, Cat. Derm. Salt. I (1869), p. 89; KIRBY, l. c. (1906), p. 67. *Gryllomorpha tibialis* SAUSSURE, Miss. Mex., Orth. (1874), p. 431.

*Larandus tibialis* SAUSSURE, Mém. Soc. Genève, XXV (1878), p. 410, Pl. 19 (LXXVII), figs. 1, 1e, i.

*Habitat*.—Two males and a female are at hand. They were taken at Corumbá and Chapada, Brazil, during the months of September and October by H. H. Smith. Carnegie Museum.

Genus PARAGRYLLUS Guérin.

*Paragryllus* GUÉRIN, Icon. Reg. Anim, Ins. (1844), p. 329; SAUSSURE, Miss. Mex., Orth. (1874), p. 441; Mém. Soc. Genève, XXV (1878), p. 411; Biol. Cent. Amer., Orth., I (1897), p. 242; KIRBY, Syn. Cat. Orth., II (1906), p. 64.

This is also a tropical American genus and representatives occur from Mexico to Brazil including the Antilles. No specimens of the genus appear to be among the material before me, unless we can include Walker's *Luzara rufipennis* from Colombia, and an apparently new form from Puerto Suarez, Bolivia, a characterization of which follows:

51. *Luzara rufipennis* Walker?

*Luzara rufipennis* WALKER, Cat. Derm. Salt. B. M., I (1869), p. 103; KIRBY, Syn. Cat. Orth., II (1906), p. 65.

*Habitat*.—There is a single mutilated male specimen at hand from Chapada, Brazil, which is doubtfully referred to Walker's *Luzara rufipennis*. The shape and color of the maxillary palpi and pronotum are somewhat different from what is indicated in Walker's description. Otherwise it agrees well with the several specimens described under the name.

52. *Luzara boliviana* sp. nov.

A moderately large and robust insect for the group. Body glabrous, on the hind femora and abdomen above inclining to tomentose. General color dark piceous, with the occiput, the disc of the pronotum, tegmina, and hind tibiae deep ferruginous, merging into piceous. Venter and the inner face of the hind tibiae pallid, inclining to testaceous. Apical and subapical segments of the maxillary palpi large and clear ivory-white, giving to the insect a very striking appearance.

Head somewhat narrower than the anterior portion of the pronotum, the occiput short and evenly rounded, the vertex and front narrowed between the antennae; the eyes fairly large, but not prominent; the ocelli also quite large, the posterior pair located well forward, the anterior one situated on the upper face of the perpendicular front.

Antennæ slender, of moderate length, the basal segments about equal in diameter to the width of the rostrum between them. Pronotum somewhat transverse, the humeral angles broadly rounded; lateral lobes a little deflexed outwardly anteriorly, the lower margin rising towards the base; front or apex very broadly and shallowly emarginate, the base squarely truncate; the disc provided behind with a rather large, but shallow, >-shaped depression, the apex of which is directed cephalad and also with a median longitudinal line. Tegmina moderately large in the male and covering about three-fifths of the abdomen, in the female lateral and extending but part way across the basal abdominal segment, or entirely missing. Cerci moderately heavy and long, nearly or quite the length of the hind femora. The latter fairly robust and having the apical portion heavy; anterior and middle legs slender, the auditory opening rather large on the inner, but minute on the outer face. Last ventral segment of the abdomen of the male broadly scoop-shaped, upturned; the supra-anal plate subquadrate, the outer apical angles provided with large, slightly outwardly directed tubercles. Ovipositor robust at its base and slender at the apex, gently falcate.

Length of body, ♂, 22 mm., ♀, 23 mm.; of pronotum, ♂ and ♀, 4 mm.; width, ♂ and ♀, 6 mm., length of tegmina, ♂, 10 mm.; ♀, 5.75 mm., width of ♂ tegmina, 8 mm.; length of hind femora, ♂ and ♀, 16.5 mm.; of ovipositor, 13 mm.

*Habitat*.—Three males and two females, Puerto Suarez, Bolivia, 150 M., Nov., 1908–Jan., 1909 (J. Steinbach). The types are in the collection of the Carnegie Museum.

### 53. *Luzara borellii* (Giglio-Tos).

*Ectecous borellii* GIGLIO-TOS, Boll. Mus. Torino, XII (1897), No. 302, p. 44; KIRBY, Syn. Cat. Orth., II (1906), p. 65.

*Habitat*.—There are three specimens, two males and one female, in the collections made by J. Steinbach, which seem to agree with the description of Giglio-Tos' *Ectecous borellii*. It certainly is not this genus and I have referred it to *Luzara* instead. It is in reality quite closely related to the preceding, if the two are not forms of the same species.

### Genus ECTECOUS Saussure.

*Ectecous* SAUSSURE, Mém. Soc. Genève, XXV (1878), p. 414; Biol. Cent.-Amer., Orth. I (1897), p. 244; KIRBY, Syn. Cat. Orth., II (1906), p. 65.



The genus *Ectecous* is entirely tropical American in its distribution, and its representatives may be recognized by reference to the synoptic key given on a preceding page.

54. ***Ectecous cantans* Saussure?**

*Ectecous cantans* SAUSSURE, Biol. Cent.-Amer., Orth., I (1897), p. 244, Pl. 12, figs. 8-10; KIRBY, *l. c.*

*Habitat*.—There is a single male specimen at hand which seems to belong here or at least near to it. It bears the label "Muñez Freire, Espirito Santo, Brazil, June 19, 1908.—Haseman."

Genus *DYSCOPHOGRYLLUS* Rehn.

*Dyscophogryllus* REHN, Can. Ent., XXXIII (1901), p. 272; KIRBY, Syn. Cat. Orth., II (1906), p. 66.

*Dyscophus* SAUSSURE (*non* Grandidier), Miss. Mex., Orth. (1874), p. 438; Mém. Soc. Genève, XXV (1878), p. 420.

This genus, like several of the other genera of the family, is entirely tropical American in its distribution. The representatives undoubtedly live largely among rocks in the crevices of and beneath which they find safe retreats from the many natural enemies they must have. Caves are also known to afford them suitable retreats. Only a single representative is at hand in the following apparently undescribed species.

55. ***Dyscophogryllus castaneus* sp. nov.**

A medium-sized, glabrous (♂) or pubescent (♀) reddish brown insect, in which the male is provided with well-developed tegmina, while the female is entirely apterous. About the size of *D. onthophagus* Berg of Uruguay.

Head short, rounded, a little narrower than the apex of the pronotum, the occiput smoothly and evenly rounded, the eyes fairly large and somewhat prominent, the rostrum short, broader than the diameter of the basal antennal segments, ocelli large; the maxillary palpi pale, elongate, the apical segment somewhat expanded and arcuate. Pronotum formed as in members of allied genera, a little wider than long, the anterior edge very shallowly and broadly roundly emarginate, behind straight. Tegmina of male well developed, covering about two-thirds of the abdomen and well provided with veins. Front and middle legs moderately long, the anterior tibiae with their auditory openings both in front and behind. Hind femora robust,

their apex slender; hind tibiæ strongly serrate and provided with 4 : 4 movable, slightly curved, strong spines. Metatarsus elongate, with serrations on both margins.

Length of body, ♂, 16 mm.; of pronotum, 3 mm.; width, 4.1 mm.; length of tegmina, 7 mm., width, 6 mm.; length of hind femora, 11.5 mm.

*Habitat*.—Rio Sapão, Bahia, Brazil, Jan. 29, 1908 (Haseman). The type is in the Carnegie Museum.

There is also a somewhat mutilated female specimen before me, which belongs to this group. It is quite strongly pubescent and somewhat hirsute, has the apex of the hind femora more robust. It comes from "Bom Fim, Bahia, Brazil, at Fazenda de Amaratu, Nov. 20, 1907" (Haseman). Whether it is of the same species I cannot say, but have so labeled it for the present.

#### Genus AMPHIACUSTA Saussure.

*Amphiacusta* SAUSSURE, Miss. Mex., Orth. (1874), p. 444; KIRBY, Syn. Cat. Orth., II-(1906), p. 67.

*Amphiacustes* SAUSSURE, Mém. Soc. Genève, XXV (1878), p. 429; Biol. Cent.-Amer., Orth. I (1897), p. 245.

*Amphiacusta* is another American genus of these crickets. Nine species have been recognized. Two of them seem to be represented in the Carnegie collections now being examined by me.

#### 56. *Amphiacusta annulipes* (Serville).

*Phalangopsis annulipes* SERVILLE, Ann. Sci. Nat., XXII (1831), p. 167; Hist. Orth. (1839), p. 309; BURMEISTER, Handb. Ent., II (1838), p. 722, etc.

For the synonymy of this species see Kirby, Syn. Cat. Orth., II, p. 68.

*Habitat*.—There are two mature specimens and one female nymph at hand. They bear the label "Los Indios, Isle of Pines, W. I., 1912 (W. Link)." They belong to the Carnegie Museum, Accession No. 4798.

#### 57. *Amphiacusta grandis* (Serville)?

*Amphiacusta grandis* SAUSSURE, Miss. Mex., Orth. (1874), p. 447; KIRBY, Syn. Cat. Orth., II (1906), p. 68.

*Amphiacustes grandis* SAUSSURE, Mém. Soc. Genève, XXV (1878), p. 431.

*Habitat*.—I have before me a single female specimen coming from Muñez Freire, Espirito Santo, Brazil, which I refer here with some doubt, since the insect was originally described from Cuba. The speci-

men was preserved in spirits and is in a rather poor condition of preservation. It was taken June 19, 1908 (Haseman). It is in the Carnegie Museum.

Genus ENDECOUS Saussure.

*Endecous* SAUSSURE, Mém. Soc. Genève, XXV (1878), p. 439; KIRBY, Syn. Cat. Orth., II (1906), p. 70.

This is another of the several American genera of the family Phalangopsitidæ which is represented among the material at hand. Up to the present time only a single species seems to have been described. Now there appears to be a second one to be recorded.

58. *Endecous arachnopsis* Saussure.

*Endecous arachnopsis* SAUSSURE, Mém. Soc. Genève, XXV (1878), p. 439; KIRBY, l. c. (1906), p. 70.

*Habitat*.—I find two males and two females of a cricket which appears to be this species. They come from San Matias, Bolivia, where they were collected in a cave on June 8, 1909 by J. D. Haseman.

59. *Endecous ferruginosus* sp. nov.

Somewhat similar to the preceding, but much larger and more robust, with longer cerci. Moderately hirsute throughout. Ferruginous, the underside a little paler, and the eyes mottled with brown. Head short, a little narrower than the anterior margin of the pronotum, the occiput evenly rounded; front between the antennæ about two-thirds the width of the diameter of one of the basal joints of former; ocelli small and inconspicuous. Pronotum wider than long, the lateral lobes moderately high and bent outwards towards the anterior margin, both angles broadly rounded, evenly truncate both at the base and the apex, the disc with several irregular depressions and a median longitudinal line. Tegmina covering about two-thirds of the abdomen, the speculum large and provided with two complete diagonal veins which suddenly bend at a right angle, and follow parallel with the anterior border. Hind femora rather robust, their apical one-fourth slender. Hind tibiæ a little longer than the femora, provided on the outer and inner carinæ with four large movable spines, the upper inner spur shorter than the middle one. Last ventral segment a little longer than wide, narrowly scoop-shaped, with the sides parallel and the apex broadly rounded. Cerci heavy at their base, nearly as long as the hind femora.

Length of body, ♂, 14 mm.; of pronotum, 3 mm.; width, 3.75 mm.; length of tegmina, 6.25 mm., width, 4.5 mm.; length of hind femora, 11.5 mm.

*Habitat*.—"Province del Sara, Bolivia, 350 M., Mch.-April, 1913 (J. Steinbach)," one male. The type is in the Carnegie Museum.

#### Genus PHALANGOPSIS Serville.

*Phalangopsis* SERVILLE, Ann. Sci. Nat., XXII (1831), p. 166; Ins. Orth. (1839), p. 367; BURMEISTER, Handb. Ent., II (1838), p. 721; SAUSSURE, Miss. Mex., Orth. (1874), p. 451; Mém. Soc. Genève, XXV (1878), p. 440; KIRBY, Syn. Cat. Orth., II (1906), p. 70.

The genus *Phalangopsis* contains insects of rather striking appearance, since they are of medium or large size, and are provided with very long spider-like legs, lack organs of flight, and even those for stridulating purposes. So far as I know, but three species have been described, one oriental, and two from tropical America. Now another American species is to be added.

#### 60. *Phalangopsis marmoratus* sp. nov.

Testaceous to ferrugineo-testaceous, marmorate and banded with fuscous. In the female entirely apterous, in the males provided with short corneous tegmina, which are peculiarly modified by having the dorso-apical margin inflated and glabrous, reminding one of the edges of leaves that have been modified into a gall-like fold by the attacks of some insect. Body sericeous and tomentose. Antennæ annulate with fuscous and pallid.

Size larger than usual, the hind femora moderately robust on their basal half. Legs broadly and regularly annulate with fuscous. Head perpendicular, considerably narrower than the wide pronotum; eyes not prominent, the vertex depressed and forming a narrow rostrum between the rather large basal antennal joints; ocelli not prominent, the anterior one located where the vertical front meets the horizontal rostrum, the posterior ones at the sides of the base of the rostrum. Pronotum large, bulging or convex, broadest towards the front, the lateral lobes highest and dilated over the coxæ of anterior legs, well rounded and ascending to the rear, anterior margin broadly and roundly emarginate, the posterior margin straight. Hind tibiæ a little longer than the femora, the margins finely spined or serrate and provided apically with 4 : 4 elongate movable spines. Metatarsus elongate and provided with two rows of spines above, but not carinate.

Length of body, ♂, 24 mm.; ♀, 25 mm.; of pronotum, ♂, 5.6 mm., ♀, 5.25 mm.; width, ♂, 7 mm., ♀, 6.5 mm.; length of tegmina, ♂, 3.5 mm.; of hind femora, ♂, and ♀ 23 mm.; of hind tibiae, ♂, 27 mm.; ♀, 23.5 mm.; of ovipositor, 16 mm.

*Habitat*.—The types, male and female, come from the "Province del Sara, Bolivia," the male 450 meters and the female 350 meters above sea-level, October, 1913 (J. Steinbach). These with several other males and a nymph are the property of the Carnegie Museum.

#### Genus ARACHNOMIMUS Saussure.

*Arachnomimus* SAUSSURE, Biol. Cent.-Amer., Orth. I (1897), p. 251; KIRBY, Syn. Cat. Orth., II (1906), p. 70.

*Arachnopsis* SAUSSURE (*non* Stimpson), Mém. Soc. Genève, XXV (1878), p. 442.

As indicated by the synopsis of the South American genera of Phalangopsitidae, the representatives of the present genus are without auditory openings on the anterior tibiae, hence possibly without stridulating apparatus as well. Two species have been recorded from tropical America prior to this time. Now specimens are at hand which seem to indicate a third.

#### 61. *Arachnomimus bahamaënsis* sp. nov.

Moderately large and rather robust, with annulate anterior and middle legs. Dark wood-brown, becoming almost black on the occiput, pronotum, and base of the abdomen above, varied with bands and blotches of paler, almost dirty white.

Head short, a little narrower than the anterior margin of the pronotum, the eyes prominent, pyriform, the apex or narrower portion below; the apex of head slightly advanced between the antennae into a short rostrum, the anterior ocellus large, situated in a depression at the top of the vertical front and immediately back of a prominent transverse ridge, posterior ocelli also rather large and located fairly close together, but far to the rear of the anterior one, thus forming an acute triangle. Antennae long and slender. Pronotum nearly twice as broad as long, the sides a little rounded, slightly wider at the base than the apex, both margins nearly straight; the lateral lobes narrowed posteriorly, both the anterior and posterior angles rounded. Body entirely apterous. Anterior and middle legs long and slender, hind legs also moderately long, the femora robust at base, slender at the apex, the hind tibiae serrate with 4 : 4 spines on their apical half,

the metatarsus above spined on both sides, internally three or four, externally seven or eight spines, the upper internal spur shorter than the median. Cerci very long, slender, and hirsute; the ovipositor moderately robust, with its apex acute. Entire body sericeous, also to a limited extent hirsute.

Length of body, ♂, 13 mm., ♀, 16 mm.; of pronotum, ♂, 3 mm., ♀, 3.5 mm.; width, ♂, 5 mm., ♀, 6 mm.; of hind femora, ♂, 15 mm., ♀, 17 mm.; of ovipositor, 9 mm.

*Habitat*.—Male and female, Blue Hills, Nassau, Bahama Islands, January, 1909. The types and three additional males are at hand. They are deposited in the Carnegie Museum. All of these insects seem to be somewhat immature and may represent the last nymphal instar.

This insect resembles the *Amphiacusta annulipes* Serville in its general appearance.

#### Family ŒCANTHIDÆ.

This family is made up of slender-bodied, herb-dwelling crickets, which are usually recognized under the name of "tree-crickets." Only two genera have been credited thus far to the American hemisphere. One of these, *Œcanthus*, is cosmopolitan, and is represented by two dozen or more species. The other, *Neoxabea*, is only known to occur in America. These two genera may be separated as follows:

##### SYNOPSIS OF THE SOUTH AMERICAN GENERA OF ŒCANTHIDÆ.

- A. Hind tibiæ armed on their margins with weak spines and fine serrations between the spines. Basal joint of the antennæ smooth or at most armed below with a very blunt tubercle. Hind wings usually but little, if any, longer than the front pair. Anal cerci rather long and slender, not sinuate.  
*Œcanthus* Serville.
- AA. Hind tibiæ unarmed even with fine serration. Antennæ with the basal joint provided at apex with a tooth-like tubercle. Hind wings nearly twice the length of the front pair. Anal cerci short, robust, sinuose... *Neoxabea* Kirby.

#### Genus ŒCANTHUS Serville.

*Œcanthus* SERVILLE, Ann. Sci. Nat., XXII (1831), p. 134; Ins. Orth. (1839), p. 358; BURMEISTER, Handb. Ent. II (1838), p. 731; SAUSSURE, Miss. Mex., Orth. (1874), p. 456; Biol. Cent.-Amer., Orth. I (1897), p. 252 and numerous recent writers.

The present genus is represented by quite a number of apparently distinct species in the two Americas, some of which no doubt occur in portions of both.



These insects have been separated by the use of such characters as comparative length and width of tegmina, length of wing, form of body, form of pronotum, etc., also by the presence or absence of dusky markings on the basal and sub-basal antennal joints. This latter character has been adopted in recent years as quite characteristic, at least for our North American forms.

In food-habits these crickets are supposed to be partially insectivorous, feeding upon aphids and other small delicate insects, which they find among the foliage which affords them shelter. Their eggs are deposited in the buds, bark, and stems of various plants.

Eight species of this genus have been credited to South American countries. The specimens at hand in part can be referred to one or another of those species. Two of these specimens do not, however, appear to belong with any of them. The subjoined synoptical key will aid in their recognition:

SYNOPSIS OF THE SOUTH AMERICAN SPECIES OF *ÆCANTHUS*.

- A. First and second antennal joints obtusely tuberculate below, each marked with a black dot. [Cuba, Central America].....*niveus* DeGeer.
- AA. First and second antennal joints not tuberculate, but first joint sometimes swollen internally.
  - b. Basal antennal joints unicolorous, without black markings. First joint swollen internally. [Trinidad].....*immaculata* Bruner.
  - bb. First and second antennal joints marked below with black.
    - c. Tegmina and wings about equal in length.
      - d. Size minute (male to tip of tegmina 9.5-10 mm.), graceful. First antennal joint gently swollen internally, faintly lined with brown.  
*minutus* Saussure.
      - dd. Size larger (male to tip of tegmina 13 mm.), robust. First antennal joint a little swollen below, the first and second longitudinally lined with black. [Chapada and Rio Grande do Sul, Brazil]  
*lincolatus* Saussure.
    - cc. Tegmina shorter than the somewhat caudate wings.
      - d. First antennal joint marked below with a longitudinal line and an apical dot, the second with a dot. [Mexico, Argentina].  
*argentinus* Saussure.
      - dd. First and second antennal joints below both marked with longitudinal black lines.
        - e. Larger (female to tip of wings 23 mm.) very slender. [Brazil]  
*varicornis* Walker.
        - ee. Smaller (female 16-18 mm.), slender. [Santarem and interior Brazil].....*tenuis* Walker.<sup>5</sup>

<sup>5</sup> Walker's descriptions are so poor and meager that it is next to impossible for one to definitely determine the insects referred to. Evidently the species *varicornis*, *tenuis*, and *peruvianus* are very similar, if not identical.

62. *Æcanthus niveus* (DeGeer).

*Gryllus niveus* DEGEER, Mém. Ins., III (1773), p. 522, Pl. 43, fig. 6; OLIVIER, Enc. Meth., Ins., VI (1791), p. 637.

*Acheta nivea* JÆGER, N. Amer. Ins. (1854), p. 159, Pl. 5, fig. 26.

*Æcanthus niveus* SERVILLE, Ins. Orth. (1839), p. 361; HARRIS, Insects Injurious to Vegetation (1841), p. 124, and numerous recent writers.

*Æcanthus niveus* var. *e. discoloratus* FITCH, Rep. Ins. N. York, III (1856), p. 95.

*Æcanthus niveus* var. *f. fuscipes* FITCH, l. c. (1856), p. 95.

*Habitat*.—While there are no representatives of *niveus* among the material now being reported upon, it is a well-known fact that the species occurs both in Mexico and some of the Central American countries and several of the West Indian islands.

63. *Æcanthus immaculatus* Bruner.

*Æcanthus immaculatus* BRUNER, Journ. N. Y. Ent. Soc., XIV (1906), p. 164.

*Habitat*.—The present writer has a single female specimen in his collection which was taken on the Island of Trinidad. This species probably also occurs in northern South American countries. It is related to *niveus*, but lacks the black dots on the underside of the first and second antennal joints.

There is a female specimen of the genus at hand coming from Corumbá (highlands), Brazil, taken in March, also without maculate basal antennal joints. It is shorter-winged, more robust, and has the hind tibiæ more strongly serrated than in the type of *immaculatus*. Its hind femora are also correspondingly shorter and more robust than in that species, while the ovipositor is longer and the cerci shorter. The pronotum likewise is shorter than in *immaculatus*, as are the hind wings. Its color is much as in *niveus*, the body and limbs being very pale flavous. Should this insect prove to represent a distinct species it may be called *Æcanthus brasiliensis*.

Length of body, ♀, 10.5 mm., of tegmina, 8 mm., of wings, 10.5 mm., of hind femora, 7.5 mm.

The type is deposited in the Carnegie Museum.

64. *Æcanthus minutus* Saussure.

*Æcanthus minutus* SAUSSURE, Mém. Soc. Genève, XXV (1878), p. 454; KIRBY, Syn. Cat. Orth., II (1906), p. 75.

*Habitat*.—There are four specimens, three males and one female, of an *Æcanthus* at hand, which are placed here. They were taken during the month of April at Chapada, Brazil (H. H. Smith, collector).

These insects are very small, averaging 10 mm. to the tips of the wings, which are no longer than the narrow tegmina. Basal antennal joints as described in the synoptical key.

65. *Æcanthus argentinus* Saussure.

*Æcanthus argentinus* SAUSSURE, Miss. Mex., Orth. (1874), p. 460; Biol. Cent.-Amer., Orth., I (1897), p. 253; Kirby, Syn. Cat. Orth., II (1906), p. 74.

*Habitat*.—While the collections now at hand do not contain specimens which can be referred to this species, it is quite certain that the species belongs to tropical and subtropical America. It may be recognized by the form of the dusky antennal markings of the basal antennal joints, *i. e.*, the line and dot on the first and the dot on the second.

66. *Æcanthus lineolatus* Saussure.

*Æcanthus lineolatus* SAUSSURE, Biol. Cent.-Amer., Orth., I (1897), p. 254; KIRBY, Syn. Cat. Orth., II (1906), p. 75.

*Habitat*.—A single male specimen from Chapada, Brazil, is placed under this name. It was taken in May, presumably by H. H. Smith.

67. *Æcanthus tenuis* Walker.

*Æcanthus tenuis* WALKER, Cat. Derm. Salt. B. M., I (1869), p. 95; SAUSSURE, Miss. Mex., Orth. (1874), p. 461; KIRBY, Syn. Cat. Orth., II (1906), p. 75.

Under this name I am including several specimens, which vary considerably among themselves in size, comparative length of thorax, etc. They all agree, however, in having the two basal joints of their antennæ provided below with a slender median longitudinal line of black. Possibly Walker's three so-called species *varicornis*, *tenuis*, and *peruvianus* would be included. This can only be decided by a careful study of his types together with a large series of specimens of both sexes from various South American localities.

*Habitat*.—The material just referred to is represented as follows:

Three females and one male, Chapada, taken during the months of April and May; a single female from Rio de Janeiro, October (H. H. Smith); a female bearing the label "Rio Bermejo, Prov. of Salta, Argentina, 400 M. Steinbach," May, 1914, Carnegie Mus. Acc. 5229.

68. *Æcanthus* sp.?

In addition to the above there is before me and apparently belonging to the same collection a single male without locality label, but with

one simply for the month of July. This male seems to agree fairly well with Beutenmüller's *Æcanthus pini*. Could it not be possible that this specimen of a local species became mixed with the South American material at the time of pinning and labeling?

### Genus NEOXABEA Kirby.

*Neoxabea* KIRBY, Syn. Cat. Orth., II (1906); p. 76.

*Xabea* RILEY (*non* Walker), Rep. Ins. Mo., Index & Suppl. (1881), p. 62; BEUTENMÜLLER, Bull. Amer. Mus. Nat. Hist., VI (1894), p. 272; BLATCHLEY, Rep. Indiana Dept. Geol., XXVI (1903), pp. 444, 453.

The insects which constitute this genus are found over a considerable portion of temperate and tropical North America and in tropical South America from Colombia to eastern Brazil. Only three species are known, two of which are now described for the first time. In general appearance they resemble the larger and slenderer species of the genus *Æcanthus*, from which they differ in such characters as mentioned on a former page in the synoptical key for separating the American genera of the family *Æcanthidae*. Nowhere do these insects seem to be abundant or even common. In habit they are supposed to be similar to the tree-crickets belonging to the genus *Æcanthus*.

A. Size smaller, graceful (male, length to tip of wings 20 mm.). Pronotum little, if any, wider at the base than at the apex; veining of the tegmina quite regular and uniform, the veins slender [Rio de Janeiro, Brazil].

*obscurifrons* sp. nov.

AA. Size larger, more robust (female, length to tip of wings 25 mm.). Pronotum decidedly wider at its base than at the apex; veining of the tegmina somewhat irregular, some of the veins enlarged.

b. Tegmina without markedly robust oblique veins on the dorsum, marked above on each elytron with a prominent median and anterior fuscous blotch. [Mexico, Central America, and the United States east of the Plains].....*bipunctata* De Geer.

bb. Tegmina furnished with robust oblique veins on the dorsum, these veins infuscated [Colombia].....*meridionalis* sp. nov.

### 69. *Neoxabea obscurifrons* sp. nov.

Having the same general form, but plainly smaller than both *N. bipunctata* and *N. meridionalis*, which latter is also described in this paper.

Head plainly broader than the anterior edge of the pronotum; eyes rather prominent and with the facets moderately large, giving to them

a granular appearance, narrowed anteriorly, a little longer than the occiput back of them; the basal antennal joint robust and provided at its apex internally with a blunt tooth. Pronotum very similar to that of the other described species, nearly twice as long as wide, the anterior margin nearly straight, the hind margin sinuate, but to a less degree than in *N. meridionalis*, the rugose border narrower than in that species. Tegmina about as long as the abdomen, the venation regular, none of the veins especially prominent, as is the case in this sex of *N. meridionalis* where several of the oblique veins are much heavier than the others, on the costal field also quite regular; wings lengthily caudate, extending beyond the tegmina a distance of about two-thirds the tegminal length. Legs very slender, the hind tibiæ entirely destitute of spines on their margins; anterior tibiæ perforated on both sides, as in both of the other species, their basal half fusiformly dilated. Cerci sinuose as described for *N. meridionalis*, and as also in *bipunctata*. Ovipositor slender, a little shorter than the hind femora.

General color uniformly pale flavo-testaceous with the exception of the front and occiput, which is dark, varying from brown between the base of the antennæ to deep pitchy black on the occiput. In the middle of this dusky area is a narrow median longitudinal flavous line, and at either side of it is a little wider gray one composed of a scale-like covering or pruinescence on the dusky background.

Length of body, ♀, 12 mm., of pronotum, 2.7 mm., of tegmina, 9.5 mm., of hind femora, 7 mm., of ovipositor, 5 mm.

*Habitat*.—Rio de Janeiro, Brazil, in October (H. H. Smith), two females. These insects are the property of the Carnegie Museum.

#### 70. *Neoxabea meridionalis* sp. nov.

About the same in size and general form as *N. bipunctata* DeGeer, but without the well-defined black dots on the tegmina, which are so prominent in that species. General color rusty testaceous, the principal veins of the tegmina, especially the oblique ones and the cross-veins near the base, knees, and tarsi of all the legs, stained brown, in some specimens inclining to black.

Head a little broader than the front edge of the pronotum, fully as long as the pronotum, when the mouth is directed forward, the eyes as long as the occiput back of them. Basal antennal joint large and

provided at apex below with a short blunt spine. Pronotum about twice as long as its extreme width; the lateral edges sinuose, somewhat expanding above the insertion of the anterior pair of legs in a similar manner to this portion of many mantids; the hind portion rather suddenly amplified and provided above just in advance of the apex with a fold that is parallel to the hind margin, and which is also reinforced. Tegmina long and narrow, reaching the tip of the abdomen in both sexes, irregularly but strongly veined on the dorsum, those on the sides more regular. Wings caudate, fully one-half longer than the tegmina. Legs rather long and slender, hind femora just surpassing (♀) or greatly prolonged beyond the tips of the elytra (♂), hind tibiae a little longer than the femora, with only a few weak spines on their distal half. Dorsum of the abdominal segments four, five, and six provided with rather large tubercles, or swellings, which may be either single or double. Anal stilets, or cerci, quite heavy and somewhat twisted or sinuate, of the same form in both sexes. Ovipositor straight, the apex not enlarged, infuscated.

Length of body, ♂ and ♀, 14-16 mm.; of pronotum, 2.9 mm.; of tegmina, ♂, 10-11 mm., ♀, 12 mm.; of hind femora, 8.5 mm.; of ovipositor, ♀, 6.25 mm.; of cerci, 2 mm.

*Habitat*.—Valparaiso (4,500 ft.), Department of Magdalena, Colombia, S. America, five males and one female, April (H. H. Smith). Types deposited in the Carnegie Museum.

#### Family TRIGONIDIIDÆ.

This family is made up of small, active insects, which are well scattered over the warmer regions of the earth. Several of the genera are represented in South America. These may be recognized by referring to the accompanying synoptic key:

#### SYNOPSIS OF THE GENERA OF TRIGONIDIIDÆ WITH SPECIAL REFERENCE TO TROPICAL AMERICA.

- A. Last joint of the maxillary palpi, usually, but not always, broadly hatchet-shaped. Antennæ with the basal joint subdepressed, rather large. Lateral lobes of the pronotum subquadrate, their inferior margin nearly horizontal, very gently hollowed at middle. Antennal foveolæ large. Front between the antennæ narrowly rostrate.
- b. Terminal joint of the palpi triangular. Tegmina in both sexes corneous, without a tympanum in the males.
- c. Anterior tibiae without a perforation, or opening; wings aborted.  
[Oriental].....*Trigonidium* Rambur.



- cc. Anterior tibiæ provided with auditory perforations, or openings, on both sides. . . . . *Metioche* Stål.
- bb. Terminal joint of the palpi either dilated at the apex or simple. Tegmina of the female coriaceous, of the male membranous, and furnished with a tympanum.
- c. Anterior tibiæ furnished with a single auditory opening, or none. Wings abbreviated.
- d. Front tibiæ without an auditory opening. [Southeastern United States]. . . . . *Falcicula* Rehn.
- dd. Front tibiæ usually with a single, none, or sometimes with two auditory openings.
- e. Terminal joint of the palpi dilated. Auditory openings circular or elliptical, one, two. Tegmina membranous, the veins well-developed. Color of insect modest. [North and South America]
- f. Anterior tibiæ with two auditory openings. Wings variable, but usually caudate. . . . . *Cyrtoxipha* Brunner.
- ff. Anterior tibiæ with a single or rarely no auditory opening, usually abbreviated . . . . . *Anaxipha* Saussure.
- ee. Terminal joint of the palpi tubiform. Auditory apparatus linear, imperforate. Tegmina corneous, the veins poorly defined. Color of insect bright. [Costa Rica]. . *Symphylloxiphus* Rehn.
- AA. Last joint of the palpi dilated, foliaceous. Antennæ with the basal joint small, narrow. Lateral lobes of the pronotum narrowed anteriorly, the lower margin entire. Tegmina corneous, furnished with a tympanum in the male. Anterior tibiæ perforated from both sides.
- b. Head vertical, trigonal. Front between the antennæ narrowly rostrate. Antennal foveolæ rather large. Pronotum short, subselliiform, the anterior angles expanded and subreflexed. [Tropical America]
  - Thamnoscirtus* Saussure.
- bb. Head porrect, subhorizontal, flattened above. Front between the antennæ broad. Antennal foveolæ small. Pronotum variable, trapezoidal, or elongate-cylindrical, the lateral margins straight. [North and South America]. . . . . *Phylloscirtus* Guérin.

#### Genus METIOCHE Stål.

- Metioche* STÅL, Öfv. Vet.-Akad. Forh., XXXIV, pt. 1 (1877), p. 44; KIRBY, Syn. Cat. Orth., II (1906), p. 78.
- Piestoxiphus* SAUSSURE, Mém. Soc. Genève, XXV (1878), p. 467; Abhandl. Senkenb. Ges. XXI (1899), p. 606; KARSCH, Berl. Ent. Zeitschr., XXXVIII (1893), p. 161.

This seems to be an oriental genus, which for the most part is confined to the Indo-Chinese region, as well as to Oceanica to the eastward. A very few forms of the genus, however, are to be found in the African region. Recently a single species has been described from northern South America.

71. *Metioche americana* Chopard?

*Metioche americana* CHOPARD, Ann. Soc. Ent. France, LXXXI (1912), p. 406, 3 figs.

*Habitat*.—Originally described from La Forestiere, French Guiana, where it was collected in April. The present author is in possession of a male from Demarara, British Guiana, where it was collected early in 1901 by a Mr. R. J. Crew. The Carnegie Museum material also contains a female specimen from Chapada, Brazil, which seems to belong here. It was taken in April by H. H. Smith.

## Genus CYRTOXIPHA Brunner.

*Cyrtoxipha* BRUNNER, Mitth. Schweiz. Ent. Ges., IV (1873), p. 168; SAUSSURE, Miss. Mex., Orth. (1874), p. 373; KIRBY, Syn. Cat. Orth., II (1906), p. 80.

*Cyrtoxiphus* SAUSSURE, Mém. Soc. Genève, XXV (1878), p. 476; BRUNNER, Ann. Mus. Geneva, XXXIII (1893), p. 21.

The insects which compose the present genus are well scattered over the warmer parts of the earth, very sparsely so in the temperate regions, but rather plentifully in the tropics, especially of South America and Oceanica. A few also have been recorded from African regions and the islands of the Indian ocean.

The genus is separable into several sections based on variations in structural features, such as form and texture of tegmina, length of wings, shape of the anterior tibiae and their auditory foramina, color, size, etc. Up to the present time about thirty so-called species have been named. The descriptions of these have been so varied, however, that it is next to impossible for one to draw up a workable synoptical key for their separation.

The material now at hand represents quite a number of forms in addition to those here listed. Some of these latter are represented by single specimens, others by imperfect ones, and still others by several individuals showing variation in both size and color. In order to properly classify our American species of the genus much close collecting is necessary in all of the regions inhabited by its members. Rather full notes on their haunts, habits, and life-history are also much needed for use in such a study. Four new forms are described in the present paper. Others no doubt are at hand, but for one or more reasons are put aside for future study.

72. *Cyrtoxipha gundlachi* Saussure.

*Cyrtoxipha gundlachi* SAUSSURE, Miss. Mex., Orth. (1874), p. 373, Pl. 7, fig. 2;

KIRBY, Syn. Cat. Orth., II (1906), p. 82.

*Cyrtoxiphus gundlachi* SAUSSURE, Mém. Soc. Genève, XXV (1878), p. 480; BOLÍVAR, Mem. Soc. Zoöl. France, I (1888), p. 158.

*Habitat*.—Originally described from the West Indies, and especially the Island of Cuba, and since recognized among material from the southern part of the United States and from northern South American countries. A specimen from Pará, Brazil (H. H. Smith), is referred to this species.

#### 73. *Cyrtoxipha cayennensis* Saussure?

*Cyrtoxiphus aztecus* var. *cayennensis* SAUSSURE, Biol. Cent.-Amer., Orth., I (1897), p. 235.

*Habitat*.—While the original specimens were taken in Guiana, there are two female specimens of a rather small, dusky *Cyrtoxipha* before me, which I am inclined to refer to this species. They were taken at Santarem, Brazil, by H. H. Smith. Owing to the considerably smaller size, these specimens may be distinct. The female of *C. azteca* measures 9.3 mm. to tip of their wings, while ours are only 8 mm. long, including the wings.

#### 74. *Cyrtoxipha variagata* Chopard.

*Cyrtoxipha variegata* CHOPARD, Ann. Soc. Ent. France, LXXXI (1912), p. 497, 3 figs.

*Habitat*.—Although the collections which were submitted to me for study contained no specimens of this insect, some are contained in the writer's collection. They were collected some years ago in British Guiana. Both sexes are represented.

#### 75. *Cyrtoxipha nitida* Chopard.

*Cyrtoxipha nitida* CHOPARD, Ann. Soc. Ent. France, LXXXI (1912), p. 408, 2 figs.

*Habitat*.—Like the preceding this slender little insect is not represented in the Carnegie collections, except by a single imperfect male specimen, which comes from Chapada, Brazil, where it was taken during the month of October (H. H. Smith). A pair in the writer's collection were collected in British Guiana by H. D. Chipman.

Both *C. nitida* and *C. variegata* have been labeled as new species in my collection for several years. Now it is a relief to know that Chopard has named and figured them so carefully that no further difficulty should arise as to their identity.

76. *Cyrtoxipha angusticollis* Saussure.

*Cyrtoxipha angusticollis* SAUSSURE, Miss. Mex., Orth., (1874), p. 377, Pl. 7, fig. 2;  
KIRBY, Syn. Cat. Orth., II (1906), p. 82.

*Cyrtoxiphus angusticollis* SAUSSURE, Mém. Soc. Genève, XXV (1878), p. 488, Pl. 19,  
(LXXX) fig. 6; Biol. Cent.-Amer., Orth., I (1897), p. 238.

*Habitat*.—The collection contains three male representatives of this species. Two of them bear the label Cacagualito (1500 ft.), Colombia. They were taken by H. H. Smith. The third comes from São Luiz de Cáceres, Matto Grosso, Brazil, where J. D. Haseman took it on May 29, 1909. Other specimens are before me, which were taken in British Guiana. These latter are in the writer's collection. It was originally described from Mexico and Panama.

77. *Cyrtoxipha peruviana* Saussure?

*Cyrtoxipha peruviana* SAUSSURE, Miss. Mex., Orth. (1878), p. 378; KIRBY, Syn. Cat. Orth., II (1906), p. 83.

*Cyrtoxiphus peruvianus* SAUSSURE, Mém. Soc. Genève, XXV (1878), p. 488.

*Habitat*.—A considerable number of specimens of the genus have been determined provisionally as Saussure's *C. peruviana*, but all of them come from localities rather distant from where the type was taken. Specimens so determined come from Cacagualito (1,500 ft.) two males, two females; Don Amo, 200 ft. one female, and Don Diego, 100 ft., one female, Dept. Magdalena, Colombia (H. H. Smith). There are also specimens from Pará, and Chapada, Brazil (H. H. Smith).

78. *Cyrtoxipha tibialis* (Saussure)?

*Cyrtoxiphus tibialis* SAUSSURE, Biol. Cent.-Amer., Orth., I (1897), p. 236, Pl. 11, fig. 40.

*Cyrtoxipha tibialis* KIRBY, Syn. Cat. Orth., II (1906), p. 82.

*Habitat*.—Some of the specimens coming from Cacagualito, Colombia, have been doubtfully referred to this species.

Another species of the genus *Cyrtoxipha* is represented in the author's collection by four specimens, which were taken at Carcaraña and Rosario, Argentina, during the summer of 1898. Since it seems to be undescribed a brief characterization is presented herewith.

79. *Cyrtoxipha atrifrons* sp. nov.

As the name indicates, this insect may be readily recognized by its pitch-black face. Otherwise it resembles *C. angusticollis* and allies in general color and size.

Of moderate size. Body slender. General color of legs, tegmina, and wings pallid-testaceous tinged with cinereous. Head a little wider than the anterior edge of the pronotum, the eyes prominent, the vertex a little depressed, and gently sulcate anteriorly, in the male mostly black, in the female varied with testaceous and ferruginous, the front below the antennæ and the eyes of both sexes glossy black, save in the female, where the base of the clypeus is transversely flavous. Pronotum short, broad, evenly expanding to the base, the anterior margin and lateral lobes largely piceous, the disc irregularly variegated with fuscous; near the hind margin and parallel with it is a series of rounded black or dark brown dots, from the centers of which emanate stiff dusky bristles, the median area provided with a longitudinal pallid line. Tegmina of both sexes a little longer than the abdomen, those of the female with five longitudinal veins on the dorsal and three on the lateral field, on the latter a couple of patches of fuscous. Abdomen varying from dirty testaceous to dull black. Hind femora robust, their outer face sometimes having a narrow longitudinal fuscous line along the middle. Ovipositor robust, short, the apex acuminate, the edges and carinæ finely crenulate, the transverse notch located at about the middle. Anterior tibial openings rather large, elliptical.

Length of body with wings, ♂ and ♀, 13 mm.; of tegmina, ♂, 6.5 mm.; ♀, 6 mm.; of hind femora, 6 mm.; of ovipositor, 2 mm.

*Habitat*.—Middle Argentina. The type is in the collection of the author.

#### 80. *Cyrtoxipha conspersa* sp. nov.

Above the average in size, a pale cinereous insect in which the legs, head, pronotum, and tegmina are conspersed with fuscous spots and dots.

General color dirty grayish flavous, the antennæ distantly fasciate with fuscous. Head of moderate size, a little broader than the anterior portion of the pronotum, the eyes large and prominent, separated by a space about equal to their longest diameter, the vertex depressed in the form of a broad arcuate transverse valley, followed anteriorly by a ridge, which separates this region from the front; antennal pits large and profound, occupying fully three-fourths of the space between the lower half of the eyes; rostrum prominent, studded with several coarse downwardly bent bristles, the ocelli small. An-

tennæ moderately long, the basal segment large. Pronotum divergent posteriorly, somewhat wider than long, the disc irregularly embrowned, provided with a median depressed longitudinal line, the front shallowly emarginate, the lateral lobes of moderate depth, the anterior angle obliquely, the posterior angle evenly, rounded, hind margin sinuose; the lateral lobes each prominently marked by two moderately large fuscous spots, the posterior portion of the dorsum furnished a little in advance of the margin by a row of equidistant round fuscous dots from the center of which emanate stiff bristles. Tegmina a little longer than the abdomen, provided with strong longitudinal veins and regular cross-veins, the interspaces strongly depressed, giving to these members a strongly corrugated appearance, lateral field with two complete and one incomplete vein, the upper interspace alone provided with cross-veins. Wings slightly infuscated, their cross-veins pallid, lengthily caudate. Legs long and slender, the anterior tibiæ fusiform, both sides provided with moderately large elliptical auditory openings, the apex of all the femora, the tibiæ, and tarsi marked with some fuscous patches; hind femora slender, the carinæ conspersed with fuscous, tip of the tibiæ, the second segment entirely, and the apex of the outer, fuscous. Ovipositor fairly robust, well-curved and with its apex coarsely serrated both above and below, the former for nearly twice the distance of the latter.

Length to tip of wings, ♀, 13.75 mm., of body, 8 mm., of pronotum, 1.5 mm., width, 2.3 mm., length of tegmina, 7 mm., of hind femora, 7 mm., of ovipositor, 3.75 mm.

*Habitat*.—The type, a female, comes from "Las Juntas (250 M.), Dept. Sta. Cruz, Bolivia," where it was taken during the month of December by J. Steinbach. A second female specimen is also at hand. It was collected at Villa Bella, Bolivia, Oct. 7, 1909, by Haseman. Both specimens are in the Carnegie Museum.

#### 81. *Cyrtoxipha maxima* sp. nov.

Large and moderately robust, with a strongly hirsute pronotum and sericeous legs. General color pale ferrugineo-flavous.

Head a little wider than the front edge of the pronotum; eyes fairly prominent; the vertex of moderate width, somewhat depressed, provided with a few bristle-like hairs; the rostrum blunt, about as broad as the greatest diameter of one of the basal antennal joints,



apical segment of the maxillary palpi lengthily funnel-shaped, its apex squarely docked. Pronotum transverse, widest behind, the humeri rounded, the anterior and posterior margins straight ( $\sigma^7$ ), or the latter faintly sinuose with the middle very broadly rounded ( $\varphi$ ). Tegmina membranous, in both sexes about equal to the abdomen in length, the dorsal field of these organs of the female provided with four longitudinal veins, cross-veins comparatively few, but regular, the lateral field with three complete and one incomplete vein. Male tegmina large and furnished with a large speculum. Wings lengthily caudate, the apical half testaceous. Hind femora large, robust, the genicular lunules piceous; hind tibiae infuscated at the points of issuance of the movable spines; second segment together with the spines and the apex of the third joint of the hind tarsi infuscated. Anterior tibiae slender, the auditory openings on both sides large and elliptical. Ovipositor robust, short, gently curved, the apex not very acuminate, smooth.

Length of body,  $\sigma^7$  and  $\varphi$ , 8.5 mm.; of pronotum,  $\sigma^7$ , 1.55 mm.,  $\varphi$ , 1.65 mm.; width,  $\sigma^7$ , 2.5 mm.,  $\varphi$ , 2.25 mm.; length of tegmina,  $\sigma^7$  and  $\varphi$ , 7 mm.; of hind femora,  $\sigma^7$ , 7.5 mm.,  $\varphi$ , 7 mm.; of ovipositor, 2.15 mm.

*Habitat*.—The male type comes from the "Province del Sara, Bolivia, 350 M." and the female from "Sta. Cruz de la Sierra, Bolivia, 450 M." Both were collected by J. Steinbach. Other specimens (male and female) are at hand. These latter were also taken in the Province del Sara, Bolivia, during the month of December, 1912. They are deposited in the Carnegie Museum.

## 82. *Cyrtoxipha abbreviata* sp. nov.

At first glance reminding one of *Anaxipha pallida* Stål, but a closer examination shows it to possess many of the characteristics of *Cyrtoxipha* and suggests the *C. aptera* Chopard. Our specimens differ from this last mentioned insect, however, in several respects. Instead of being simply "testaceous" it is ferruginous with piceous and fuscous markings. The female of the present species, as indicated by the type, has the dorsal field of the tegmina provided with seven longitudinal veins and the lateral field with but three.

Size, medium, form robust; the head large, a little broader than the front margin of the pronotum; eyes prominent, vertex depressed, but

rounded; rostrum short, broad; basal antennal segment black, large, and with a large, round, smooth, amber-colored, eye-like protuberance on the basal half of the upper side; the two succeeding segments also black, beyond pallid, changing apically to fuscous; face and mouth-parts black, shining; terminal segment of palpi elongate-triangular. Pronotum clothed with coarse hairs, in the female subcylindrical, but little, in the male decidedly, expanding towards the base, the base in former broadly rounded, in the latter straight. Tegmina of female somewhat coriaceous, a little shorter, in the male a little longer, than the abdomen, with the speculum large and slightly elongate. Hind femora moderately robust. Anterior tibiae perforated on both sides, the openings large and oblong. Ovipositor robust, arcuate, the apex evenly tapering and gently roughened above.

Length of body, ♂, 5.6 mm.; ♀, 6 mm.; of pronotum, ♂, 1.35 mm., ♀, 1.25 mm.; width, ♂, 1.9 mm., ♀, 1.3 mm.; length of tegmina, ♂, 5.25 mm., ♀, 3.5 mm.; of hind femora, ♂ and ♀, 5.15 mm.; of ovipositor, 2.9 mm.

*Habitat*.—Chapada, Brazil, Jan., April, May, and Nov. (H. H. Smith). Several males and females. The types are deposited in the Carnegie Museum.

The abdomen and sides of the pronotum and the lateral field of the tegmina vary from dark brunneo-ferruginous to black. The legs are to some extent infuscated in the form of bands, and the veins of the male tegmina are likewise varied with piceous.

#### Genus *ANAXIPHA* Saussure.

*Anaxipha* SAUSSURE, Miss. Mex., Orth. (1874), p. 370; BEUTENMÜLLER, Bull. Amer. Mus. Nat. Hist., VI (1894), pp. 267, 273; BLATCHLEY, Rep. Indiana Dept. Geol. XXVII (1903), p. 454; KIRBY, Syn. Cat. Orth., II (1906), p. 86. *Anaxiphus* SAUSSURE, Mém. Soc. Genève, XXV (1878), p. 475.

The representatives of this American genus are rather closely related to those of *Cyrtoxipha* and may be recognized by the characters mentioned in the synopsis of the genera given on a preceding page of this paper. Only a very few species have thus far been recognized. Possibly others may occur in middle and South American countries.

#### 83. *Anaxipha pallens* (Stål)?

*Trigonidium pallens* STÅL, Eugenie's Resa, Orth. (1860), p. 318. *Anaxipha pallens* SAUSSURE, Miss. Mex., Orth. (1874), p. 372; KIRBY, Syn. Cat. Orth., II (1906), 87.

*Habitat*.—Specimens of an insect coming from the following localities have been referred somewhat doubtfully to this species: Corumbá, Brazil, April, one female, Piedra Blanca, April, two males and one female, all presumably having been taken by H. H. Smith. All four of the specimens are rather strongly infuscated in their general coloring and may belong to a distinct species.

A fifth specimen, a female, is also present. This last one bears the label "Bahia (West Side), Brazil, Oct. 26, 1907, by sweeping in reeds and grass in a swampy place near the sea, J. D. Haseman." Possibly the true *A. pallens*, since it agrees better with Stål's characterization of the species.

#### Genus SYMPHYLOXIPHUS Rehn.

*Symphylloxiphus* REHN, Proc. U. S. Nat. Mus., XXX (1906), p. 603.

*Symphylloxiphus* is another of the tropical American genera of the Trigonidiidæ which is very apt to be found in the region covered by this paper. It is related to the preceding genus, from which its members differ as indicated by the generic synopsis given on a preceding page. Only a single species, *S. magnificum* Rehn, has been described thus far. It comes from Costa Rica.

#### Genus THAMNOSCIRTUS Saussure.

*Thamnoscirtus* SAUSSURE, Mém. Soc. Genève, XXV (1878), p. 490; KIRBY, Syn. Cat. Orth., II (1906), p. 84.

The little crickets referred to the present genus look more like coleopterous insects than like gryllids. They move about rather rapidly over the vegetation, as do the insects they resemble. In color they are black, blue, green, or yellow, and more or less streaked or dotted as are tiger-beetles. They are confined to tropical America and chiefly, but not entirely, to the countries in the northern parts of South America. Five species have been described.

#### 84. *Thamnoscirtus cicindeloides* (Gerstaecker).

*Phylloscirtus cicindeloides* GERSTAECKER, Stett. Ent. Zeit., XXIV (1863), p. 428;

SAUSSURE, Miss. Mex., Orth., (1874), p. 369.

*Phylloscirtus villatus* BURMEISTER, Abhandl. Ges. Halle, XV (1880), p. 18.

*Thamnoscirtus cicindeloides* SAUSSURE, Mém. Soc. Genève, XXV (1878), p. 491,

Pl. 16 (XLVI) figs. 1, 1e, a, b; KIRBY, l. c.

*Habitat*.—There are specimens of both sexes at hand. They come from Chapada, Pará, and Santarem, Brazil, and were collected during the months of December, January, April, and June (H. H. Smith).

85. *Thamnoscirtus vittatus* (Gerstaecker).

*Phylloscirtus vittatus* GERSTAECKER, l. c. (1863), p. 428; SAUSSURE, Miss. Mex., Orth., (1874), p. 369.

*Phylloscirtus vittatus* BURMEISTER, l. c., (1880), p. 16.

*Thamnoscirtus vittatus* SAUSSURE, Mém. Soc. Genève, XXV (1878), p. 492; KIRBY, l. c. (1906), p. 84.

*Habitat*.—While there are no representatives of *T. vittatus* among the collections now being reported upon, there are two specimens in the writer's possession which were taken by R. J. Crew at Demarara, British Guiana, in 1901.

## Genus PHYLLOSCYRTUS Guérin.

*Phylloscirtus* GUÉRIN, Icon. Reg. Anim., Ins. (1844), p. 333; GERSTAECKER, Stettin. Ent. Zeit. XXIV (1863), p. 424; SAUSSURE, Miss. Mex., Orth. (1874), p. 363; KIRBY, Syn. Cat. Orth., II (1906), p. 84.

*Phylloscirtus* SAUSSURE, Mém. Soc. Genève, XXV (1897), p. 238; BURMEISTER, Abhandl. Ges. Halle, XV (1880), p. 12; BEUTENMÜLLER, Bull. Amer. Mus. Nat. Hist., VI (1894), pp. 268, 273; BLATCHLEY, Proc. Indiana Acad. Sci., 1891, pp. 128, 137; Rep. Ind. Dept. Geol., XXVII (1903), p. 456.

*Cranistus* STÅL, Eugenie's Resa, Orth. (1860), p. 315.

*Phyllopalpus* UHLER, Proc. Ent. Soc. Philad., II (1864), p. 543.

This is another strictly American genus of small crickets, nearly all the known species of which are found in the tropical countries of South America. Up to the present time fourteen species have been described. While the collection now being studied contains but three specimens belonging to apparently that many species, one of these seems to be new and is characterized herewith.

86. *Phylloscirtus comptus* (Walker)?

*Phyllopalpus comptus* WALKER, Cat. Derm. Salt. B. M., I (1869), p. 69.

*Phylloscirtus comptus* KIRBY, Syn. Cat. Orth., II (1906), p. 85.

*Habitat*.—A single female coming from "Puerto Suarez, Bolivia, 150 M." (J. Steinbach, collector) is referred doubtfully to Walker's *comptus*.

87. *Phylloscirtus similis* sp. nov.

Related to *P. collurides* Saussure, but much smaller. A dark-colored insect with rufous head, infuscated legs, and pallid underparts. Wings lengthily caudate.

Head rather narrow, but little wider than the anterior portion of the pronotum; eyes of medium size, not prominent, separated by a

space a little greater than their longest diameter; antennæ with rather large basal segments, these flattened and transverse, a trifle broader than long, the succeeding segments considerably smaller but moderately robust and hirsute. Maxillary and labial palpi missing, as are the greater portion of the antennæ. Pronotum short, broader than long, the base plainly wider than the apex, provided with a few anteriorly and posteriorly directed heavy bristles, the middle furnished with a longitudinal impressed line. Tegmina about as long as the abdomen, provided with heavy longitudinal veins, but without cross-veins. Wings pallid and lengthily caudate, extending fully one-half of their length beyond the tip of the abdomen, their costal field and apex infuscated. Cerci robust at base, long and lengthily hirsute, reaching a trifle beyond the apex of the caudate wings. Ovipositor gently arcuate, rather long, and with the apex lengthily acuminate. Hind femora moderately robust at the base and evenly tapering to the small apical region. Hind tibiæ provided with the usual movable spines on the lateral canthi. Pronotum entirely faintly blue black, the tegmina also black with a faint bluish tinge, upper portion and outer face, together with the lower carinæ of the hind femora black, remainder, except the apex which is pale rufous, flavous, hind tibiæ infuscated; anterior and middle femora on their apical half and the tibiæ basally heavily clouded with dull black, otherwise dirty flavous. Ovipositor piceous.

Length of body, ♀, 9 mm., of pronotum, 1.55 mm., width, 2.15 mm., length of tegmina, 6 mm., of wings, 12 mm., of hind femora, 6 mm., of ovipositor, 5 mm.

*Habitat*.—A single female, the type, comes from Puerto Suarez, Bolivia, where it was taken at an altitude of 150 meters above sea-level. (J. Steinbach, collector.) The type is in the Carnegie Museum.

#### 88. *Phylloscyrtus* sp.?

In addition to the two forms of the genus already mentioned there is a nymph of what appears to be a third species in the collection from San Antonio de Guaporé, Brazil. It was taken by J. D. Haseman on an island in the Rio Guaporé, July 26, 1909.

Judging from its color it may represent an undescribed species, but is too immature to warrant even an attempt at naming and describing it. The accession number of this last insect is 4043.

## Family ENEOPTERIDÆ.

This family is represented in South and Middle America by two, or possibly three, genera, which may be separated as follows:

- A. Anterior ocellus exerted on the anterior side of the rostrum. Legs elongate. Hind metatarsus very long, biserially serrate. Tegmina fully developed in both sexes. [Tropical America].....*Eneopterus* Burmeister.
- A. A. Anterior ocellus exerted on the superior side of the rostrum. Legs shorter. Hind metatarsus shorter, one-spined on one margin, four-spined on the other. Tegmina abbreviated in the female. [Brazil]  
*Ligypterus* Saussure, or *Lebinthus* Stål.

## Genus ENEOPTERA Burmeister.

- Eneoptera* BURMEISTER, Handb. Ent., II (1838), p. 736; SAUSSURE, Miss. Mex., Orth. (1874), p. 481; KIRBY, Syn. Cat. Orth., II (1906), p. 90.
- Eneopterus* SAUSSURE, Mém. Soc. Genève, XXV (1878), p. 531; Biol. Cent.-Amer., Orth., I (1897), p. 256.
- Platydyctylus* BRULLÉ (*non* Cuvier), Hist. Nat. Ins., IX (1835), p. 176; SERVILLE, Ins. Orth. (1839), p. 363.

89. *Eneoptera surinamensis* DeGeer.

- Gryllus surinamensis* DEGEER, Mem. Ins., III (1773), p. 519, Pl. 43, fig. i.
- Eneoptera surinamensis* SAUSSURE, Miss. Mex., Orth. (1897), p. 483; KIRBY, Syn. Cat. Orth. II (1906), p. 90.
- For extended synonymy see Kirby, *l. c.*

*Habitat*.—There are numerous specimens of this common species in the collections now being reported upon. They come from such widely scattered localities as Sta. Lagoas, Minas Geraes, Brazil; Bogotá, Colombia; Santa Cruz de la Sierra, Bolivia, etc. Other material has been studied from the Island of Trinidad, British and French Guiana, Paraguay, northern Argentina, Pernambuco, Victoria, and Rio de Janeiro, Brazil, etc. In fact the species occurs throughout tropical, Central and South America, where it is very abundant in forests among the fallen leaves and other rubbish in which it lives. It is needless to state that its color is such as to protect it quite well from various enemies, which prowl about its haunts.

Like most insects, which have a very extended distribution, this cricket varies considerably in size and also to some extent in color. In fact, the large synonymy shown in the references given in Kirby's Synonymic Catalogue of the Orthoptera would indicate such variation.



## Genus LEBINTHUS Stål.

*Lebinthus* STÅL, Æfv. Vet.-Akad. Forh., XXXIV, pt. 1 (1877), p. 50; BOLÍVAR, An. Soc. Españ., XVIII (1889), p. 425; KIRBY, Syn. Cat. Orth. II (1906), p. 88. *Paraeneopterus* SAUSSURE, Mém. Soc. Genève, XXV (1878), p. 533.

This is an oriental genus, the representatives of which, at least for the most part, are confined to the Philippines and adjacent regions. Under the generic name *Paraeneopterus* of Saussure, however, Giglio-Tos has credited a species to Darien. Stål and Saussure both selected the same species for the type of their respective genera.

90. *Lebinthus elegans* (Giglio-Tos)?

*Paraeneopterus elegans* GIGLIO-TOS, Boll. Mus. Torino, XII (1897), No. 301, p. 8. *Lebinthus* (?) *elegans* KIRBY, Syn. Cat. Orth. II (1906), p. 88.

*Habitat*.—There is a single nymph at hand of what seems to be an example of this genus. As compared with typical specimens of *L. bitæniatus* from the Philippines, the nymph referred to here seems to be congeneric. The broad dorsal pale stripe as described for *elegans* will apply to our nymph. It is therefore referred to Giglio-Tos's species, but with some doubt. Our specimen seems to come from Pará (Brazil) where it was taken during the month of July presumably by H. H. Smith. It is deposited in the Carnegie Museum.

Other specimens of apparently the same insect are in the writer's collection. They were collected at Pernambuco, Brazil. Possibly they may be the immature stages of *Ligypterus heydeni* Saussure, which also occurs in Brazil.

## Family STENOGRYLLIDÆ.

This family of Grylloidea is composed of rather large and moderately robust insects, in which the hind tibiæ are biseriately spined, instead of having these members both spined and serrate. In habits these crickets are subarboreal, living on, or near, the ground among fallen leaves and herbage. Their colors are chiefly testaceous, ochraceous, or fulvous with some darker markings. At least two genera are known from tropical America.

## SYNOPSIS OF THE GENERA OF SOUTH AMERICAN STENOGRYLLIDÆ.

- A. Anterior tibiæ with an auditory opening on their inner face. Pronotum with the lateral lobes a little narrowed in front. . . . . *Stenogryllus* Saussure.
- AA. Anterior tibiæ without an auditory opening. Lateral lobes of the pronotum rounded, not narrowed in front. . . . . *Pseudogryllus* Chopard.

## Genus STENOGRYLLUS Saussure.

*Stenogryllus* SAUSSURE, Mém. Soc. Genève, XXV (1878), p. 554.

Only a single species of this genus is known. It is the *Stenogryllus phthisicus* Saussure from St. Domingo, West Indies. No specimens of it are at hand.

## Genus PSEUDOGRYLLUS Chopard.

*Pseudogryllus* CHOPARD, Ann. Soc. Ent. France, LXXXI (1912), p. 411.

Like the preceding, the present genus is monotypic, containing so far as at present known only the species *P. elongatus* Chopard from French Guiana, unless we can include the insect described as *Metrypus heros* Brunner and its allies, which are mentioned below under the generic name *Tafalisca* Walker.

## Genus TAFALISCA Walker.

*Tafalisca* WALKER, Cat. Derm. Salt. B. M., I (1869), p. 52; KIRBY, Syn. Cat. Orth., II (1906), p. 107.

*Metrypa* BRUNNER, Mith. Schweiz. Ent. Ges. IV (1873), p. 168; SAUSSURE, Miss. Mex., Orth. (1874), p. 513.

*Metrypus* SAUSSURE, Mém. Soc. Genève, XXV (1878), p. 671.

The present genus is composed of about a dozen species of moderately large and fairly robust crickets, most of which are to be found in the West Indies and the northern countries of South America.

91. *Tafalisca lineatipes* sp. nov.

Most closely related to the *Metrypus luridus* of Saussure, as described in Mém. Soc. Genève, XXV, p. 673, pl. 19 (LXXIII), figs. 3h, 3b, but apparently not the same as *Tafalisca lurida* Walker.

Large, robust, testaceous, the head, legs, and abdomen covered with a close, short, pale, silky pile. The pronotum bordered narrowly in front and broadly behind by dark piceous. Hind femora provided externally with a prominent longitudinal black line, the hind tibiæ brunneo-ferruginous, and the ovipositor piceous.

Length of body, ♀, 36 mm., of pronotum, 5.5 mm., width, 6 mm., length of tegmina, 27 mm., of wings, 30 mm., of hind femora, 17 mm., of ovipositor, 16 mm.

The dorsal field of the tegmina of this insect is provided with longitudinal veins, and between them is weakly but rather closely and irregularly reticulate; at the sides the reticulation is mixed, this area

being provided with both quadrate and irregular areoles. The anterior femora are rather broadly inflated and evenly arcuate above. The hind tibiæ and metatarsi are spined, as described for *T. lurida* Saussure.

*Habitat*.—The type and only specimen at hand comes from Jamaica, W. I., and bears the Carnegie Museum Accession No. 2306.

Judging from the structure of the apex of the ovipositor of this insect and its allies I would suggest a relationship to the genus *Pseudogryllus* Chopard (Ann. Soc. Ent. France, LXXXI, p. 411) which genus, along with *Stenogryllus* are suggested as forming a separate group.

### Family PODOSCIRTIDÆ.

This is one of the most extensive families of the Grylloidea and is well represented throughout the warmer parts of the temperate countries, as well as the tropical regions of the globe.

#### SYNOPSIS OF THE SOUTH AMERICAN GENERA OF PODOSCIRTIDÆ.

- A. Body very slender. Posterior metatarsus somewhat elongate, biseriately serrate. Front tibiæ minus an auditory opening. Male tegmina very small, without a tympanum (female without tegmina). [Brazil]

*Cylindrogryllus* Saussure.

- A.A. Body variable. Posterior metatarsus shorter.

- b. Male tegmina provided with a complete tympanum and also furnished with a speculum, the median vein branched.

- c. Head globose, the front not rostrate, transversely carinate. Tegmina of the female broad, leathery. Anterior tibiæ perforated on both sides.

*Phyllogryllus* Saussure.

- cc. Head short, not globose, the occiput short, mouth below. Front rostrate between the antennæ.

- d. Tegmina of the male provided with many fully developed oblique veins. Front tibiæ furnished externally with auditory openings. Valves of the ovipositor variable.

- e. Posterior metatarsus compressed, carinated above, 3-4-dentate. Anterior tibiæ compressed, auditory openings present on both sides. Tympani of the tegmina with the oblique veins parallel and nearly straight. Ovipositor dentate at its apex.

*Diatrypa* Saussure.

- ce. Posterior metatarsus short, but little compressed, not carinated. Oblique veins of tegmina flexuous, not parallel.

- f. Body slender, cylindrical. Rostrum of the front narrow.

- g. Posterior metatarsus frequently two- to three-toothed. Tegmina of male provided with numerous oblique veins. Anterior tibiæ perforated on the innerside.

*Paræcanthus* Saussure.

- gg. Posterior metatarsus smooth, not toothed. Tegmina of male provided with two divergent oblique veins. Front tibiæ with oblong auditory openings on both sides. Antennæ excessively long. . . . . *Stenæcanthus* Chopard.
- ff. Body somewhat robust or depressed; head large, the rostrum of the front wide (Posterior metatarsus one- to three-toothed. Tegmina with two oblique veins.) . . . *Amblyrhethus* Kirby.
- dd. Tegmina of male with one or two incomplete oblique veins. Valves of the ovipositor lanceolate, acute.
- e. Surface of the head, pronotum, and legs somewhat wrinkled and strongly pubescent. Ocelli arranged in a triangle. Auditory opening of the front tibiæ located on the inside.
- Laurepa* Walker.
- ee. Surface of the head, pronotum, and legs smooth and glabrous. Ocelli arranged in a transverse arcuated line.
- f. Auditory opening on the inner side. Tegmina of the female somewhat leathery, on the dorsal field the veins are distant and pectinated; the oblique branches of the mediastine vein gently flexuous. Head and pronotum a little convex.
- Hapithus* Uhler.
- ff. Auditory openings of anterior tibiæ located on both sides. Tegmina of the female membranous, veins longitudinal; the mediastine vein with its oblique branches numerous and s-sinuous. Head and pronotum somewhat flattened from above. . . . . *Orocharis* Uhler.
- bb. Male tegmina without a tympanum, in this respect similar to the female.
- c. Anterior tibiæ furnished with auditory apparatus.
- d. Auditory openings found on both sides of the front tibiæ.
- e. Ovipositor straight, long, and slender, the valves acutely dentate or obtuse. . . . . *Podoscirtus* Serville.
- ee. Ovipositor short, depressed, sublamellar, valves flattened.
- Heireceous* Saussure.
- dd. Anterior tibiæ provided with a single auditory opening. Tegmina, when present, fully developed, elongate, the median vein branched.
- e. Auditory opening located on the inner side of the anterior tibiæ.
- f. Body normal. Head short, somewhat elevated. Pronotum rather short, wider than long, its posterior margin bisinuate, the canthi more or less conspicuous. Ovipositor slender, not flattened from above. . . . . *Aphonomorphus* Rehn.
- ff. Body slender, cylindrical. Head prominent, elongate, and elevated. Pronotum also elongate, cylindrical, the hind margin transverse, subarcuate, without canthi. Ovipositor flattened. . . . . *Stenaphonus* Saussure.
- ee. Auditory opening placed on the outer side of the anterior tibiæ.
- Anaudus* Saussure.

- cc. Anterior tibiae without auditory openings on either side.<sup>1</sup>  
 d. Body provided with wings.  
   *e.* Tegmina regularly veined. . . . . *Tafalisca* Walker.  
   *ee.* Tegmina irregularly veined. . . . . *Nessa* Walker.  
 dd. Body apterous or subapterous. . . . . *Parametrypa* Brunner.

### Genus CYLINDROGRYLLUS Saussure.

*Cylindrogryllus* SAUSSURE, Mém. Soc. Genève, XXV (1878), p. 556; KIRBY, Syn. Cat. Orth., II (1906), p. 92.

This genus, which is known by a single species, seems to be confined to Brazil. Just what its habits are seems to be doubtful, otherwise it is possible that more material would be available for study.

### 92. *Cylindrogryllus brevipennis* Saussure.

*Cylindrogryllus brevipennis* SAUSSURE, Mém. Soc. Genève, XXV (1878), p. 557; KIRBY, *l. c.*

*Habitat*.—The collections made by H. H. Smith in April at Chapada, Brazil, contain two female specimens of a small gryllid, which run to the genus *Cylindrogryllus* of Saussure. Since but a single species of the genus is known, and these specimens agree fairly well with the characterization of *C. brevipennis*, as given by Saussure, they are referred to it. As long as the male alone was described, the subjoined brief description of the female is now added.

Rather small, cylindrical, slender, entirely destitute of tegmina and wings, entire body together with the legs rather closely pubescent, pale brunneo-ferruginous, the legs and underside a little paler. Head large, wider than the anterior margin of the pronotum, the eyes prominent, but not exceptionally large, fully twice as far apart as their diameter; the front rather broadly rostrate and roundly protuberant; ocelli inconspicuous, the anterior one situated in a depression, located on a line drawn from the superior edges of the antennal scrobes. Pronotum cylindrical, nearly twice as long as broad, the anterior and posterior edges provided with a rather heavy border, very gently but roundly emarginate at its middle. Abdomen long and slender, gently fusiform; ovipositor moderately robust, gently arcuate, the apex spear-shaped with the lateral edges faintly crenulate. Hind femora moderately robust; metatarsus provided at its sides above with 2 : 3 short coarse spines or teeth.

<sup>1</sup> Possibly this entire section should be referred to the preceding family. If so, it would fall in the section AA.—*The author*.

Length of body, ♀, 12 mm.; of pronotum, 3.4 mm.; of hind femora, 10 mm., of ovipositor, 9 mm.

These specimens belong to the Carnegie Museum.

#### Genus PHYLLOGRILLUS Saussure.

*Phyllogrillus* SAUSSURE, Mém. Soc. Genève, XXV (1878), p. 558; Biol. Cent.-Amer. Orth., I (1897), p. 257; KIRBY, Syn. Cat. Orth., II (1906), p. 92.

The present genus seems to be confined to tropical South America and presumably contains several species. But two are recognized in Kirby's Synonymic Catalog of the Orthoptera since he unites a couple of the described forms.

#### 93. *Phyllogrillus velutinus* (Walker)?

*Platydictylus velutinus* WALKER, Cat. Derm. Salt. B. M., I (1869), p. 77.

*Encoptera* (?) *velutina* SAUSSURE, Miss. Mex., Orth. (1874), p. 485.

*Phyllogrillus mortuifolia* SAUSSURE, Mém. Soc. Genève, XXV (1878), p. 559, Pl. 18 (LXI), figs. 1-5; Biol. Cent.-Amer. Orth., I (1897), p. 257; KIRBY, Syn. Cat. Orth., II (1906), p. 92.

*Habitat*.—Four females and three males together with five nymphs of an insect which in a measure agree with Walker's characterization of *velutinus* are referred to this species. These insects were taken at Chapada, Brazil, during the months of August and September (H. H. Smith). In addition to these I find two males labeled "Rio Guaporé, below the Rio São Miguel, Brazil, Aug. 22, 1909 (Haseman)." These latter bear a general resemblance to the Chapada specimens, but differ materially in several respects both as to structure and coloration.

It is barely possible, therefore, that we have at least two species here. The *P. mortuifolia* Saussure from Cayenne is larger than our specimens, while the *P. pipilans* Saussure is undoubtedly distinct from the others, thus suggesting at least four species. At present, however, I shall not attempt to separate these forms any further, leaving this for the future, when more material shall have been accumulated.

#### Genus DIATRYPA Saussure.

*Diatrypa* SAUSSURE, Miss. Mex., Orth. (1874), p. 476; KIRBY, Syn. Cat. Orth., II, (1906), p. 92.

*Diatrypus* SAUSSURE, Mém. Soc. Genève, XXV (1878), p. 561; Biol. Cent.-Amer. Orth., I (1897), p. 259; CHOPARD, Ann. Soc. Ent. France, LXXXI (1912), p. 414.

The crickets, which are referred to the genus *Diatrypa*, with few



exceptions are the smallest of the American Podoscirtidæ and are generally slender insects. The genus contains upwards of a dozen described species. No doubt there are a number of others still to be met with in tropical South American countries, when more general and careful collecting shall have been done. Some of the species are plain testaceous throughout, while others are variegated, and at least one is deep steel-blue in color. I shall not attempt to tabulate them now since the present paper is already too extended.

94. *Diatrypa colombiana* sp. nov.

Somewhat hirsute, especially the head and pronotum. A trifle above the average in size. A slender, fusco-testaceous insect, with the occiput, most of the lateral lobes of the pronotum, and the median vein of the tegmina dark fuscous or piceous. Head short, the eyes prominent, separated in front by a distance about equal to their greatest diameter, the rostrum scarcely as wide as one of the large basal antennal joints, gently sulcate. Pronotum narrowed gently forward, broader than long, the lateral lobes moderately high and with the lower margin broadly rounded; the anterior edge straight, the posterior margin broadly sinuose. Tegmina elongate, narrow, the speculum elongate with its anterior end somewhat acuminate, the hind portion rounded and the middle crossed transversely by a single vein. Wings lengthily caudate, the apical portion slightly infuscated. Last ventral segment, or subgenital plate, moderately large, a little longer than broad, expanding apically and broadly bilobed.

Length of body, ♂, 10 mm., of pronotum, 2 mm.; width, 2.5 mm., length of tegmina, 10 mm., of wings, 13 mm., of hind femora, 6.5 mm.

*Habitat*.—Don Amo (2,000 ft.) Dept. Magdalena, Colombia (H. H. Smith), a single male, the property of the Carnegie Museum.

There are two other specimens of the genus at hand, also males. These are of about the same size, but vary in some of the structural characters as well as somewhat in their coloration. The one which approaches most closely to our type comes from the Province del Sara, Bolivia, 350 M. The other was taken at Santa Cruz de la Sierra, Bolivia, 450 M. Both were collected by J. Steinbach. The latter has two transverse veins on the speculum—possibly only an accident.

95. *Diatrypa tuberculata* Saussure?

*Diatrypa tuberculata* SAUSSURE, Miss. Mex., Orth. (1874), p. 479; KIRBY, Syn. Cat. Orth., II (1906), p. 93.

*Habitat*.—A single male and four females of a *Diatrypa* from Chapada and Corumbá, Brazil, are referred to Saussure's *tuberculata* with some doubt. They were taken during the months of March, April, September and October, presumably by H. H. Smith.

This species was originally described from Buenos Aires, Argentina.

96. *Diatrypa ornata* Saussure.

*Diatrypa ornata* SAUSSURE, Miss. Mex., Orth. (1874), p. 480; KIRBY, Syn. Cat. Orth., II (1906), p. 93.

*Habitat*.—I find a single female specimen belonging to the genus *Diatrypa*, which agrees in most respects with Saussure's description of *D. ornata*. Hence I am referring it to that species. The specimen before me does not have the rufous tinge about the head and pronotum, but has them entirely deep steel-blue. It bears the label "Along the Rio Guaporé, below Rio San Miguel, Brazil, Aug. 22, 1909 (Haseman)."

## Genus PARÆCANTHUS Saussure.

*Paræcanthus* SAUSSURE, Miss. Mex., Orth. (1874), p. 468; Mém. Soc. Genève. XXV (1878), p. 593; Biol. Cent.-Amer. Orth., I (1897), p. 261; KIRBY, Syn. Cat. Orth., II (1906), p. 96.

*Carsidava* WALKER, Cat. Derm. Salt. B. M., I (1869), p. 53.

*Paræcanthus* is still another American genus of the family Podoscirtidæ, which contains several described South American species. These insects bear a rather striking resemblance to representatives of both *Diatrypa* and *Orocharis*, but differ from them as shown in the synoptic key printed on a preceding page.

Only two specimens of this genus are represented among the collections now being studied. They are both males and represent quite widely separated localities. The smaller of the two comes from Pará, Brazil, and might possibly be the *Carsidava cinerascens* Walker, which Kirby (*see* Syn. Cat. Orth. II, p. 97) places in the present genus. It also agrees fairly well with the description of *P. vicinus* Chopard (Ann. Soc. Ent. France, LXXXI, pp. 420-421, 3 figs.) both in size and color. Since it lacks the anterior tibiæ it is unsafe to definitely locate it with the latter, and Walker's description is too incomplete

to permit of placing it there. The second specimen is decidedly larger, and seems to differ sufficiently from the described forms to warrant its description as a new species.

97. *Parœcanthus picipes* sp. nov.

Related to both *P. cinerascens* Walker and *P. vicinus* Chopard, but larger. Head, pronotum, and the greater part of the hind femora fulvous or dark ferruginous; the anterior and middle legs together with the apex of the hind femora and the hind tibiæ piceous, or pitch-black; other parts dirty testaceous. Head of moderate size, about as wide as the front edge of the pronotum; the eyes fairly prominent; the front rostrate, a little narrower than the broad basal antennal segment; the posterior ocelli large, the anterior one very small, almost obliterated, situated in a slight pit at the very apex. Pronotum a little longer than its anterior width, evenly broadening towards the base, the disc furnished with a median longitudinal impressed line and two lateral triangular patches as in *P. vicinus*; the front margin roundly truncate, the base subangulate, not sinuose. Tegmina large, a little longer than the abdomen, the tympanum a little longer than wide, subangulate both in front and behind; the oblique veins five in number, the mediastin vein twelve-branched. Wings caudate. Legs short, the anterior tibiæ inflated basally, and perforated on both sides in a similar fashion as figured for *P. vicinus*.

Length of body, ♂, 17 mm., of pronotum, 2.9 mm., width, 4.15 mm., length of tegmina, 15 mm., of wings, 19 mm., of hind femora, 8.5 mm., of hind tibiæ, 7 mm.

*Habitat*.—The type and only specimen at hand comes from Quatro Ojos, Dept. Sta. Cruz, Bolivia, where it was taken at an elevation of three hundred meters above sea-level, by J. Steinbach. It is in the collection of the Carnegie Museum and belongs to Accession No. 5059.

Genus *HAPITHUS* Uhler.

*Hapithus* UHLER, Proc. Ent. Soc. Philad., II (1864), p. 546; KIRBY, Syn. Cat. Orth., II (1906), p. 97.

*Apithis* SAUSSURE, Miss. Mex., Orth. (1874), p. 486.

*Apithes* SAUSSURE, Mém. Soc. Genève, XXV (1878), p. 603; Biol. Cent.-Amer. Orth., I (1897), p. 265; BLATCHLEY, Proc. Indiana Acad. Sci., 1891, pp. 128, 139.

*Labussa* WALKER, Cat. Deim. Selt. B. M., I (1869), p. 75.

The genus *Hapithus*, which is entirely American in its distribution, contains about a dozen species. These are distributed from southern

Brazil to about the fortieth degree of north latitude. They may be recognized by the characters described in the generic synopsis given on a preceding page. Less than one-half of the described forms are recorded from South American countries.

98. *Hapithus annulicornis* (Saussure)?

*Apithis annulicornis* SAUSSURE, Miss. Mex., Orth. (1874), p. 491; Kirby, Syn. Cat. Orth., II (1906), p. 98.

*Habitat*.—A single female specimen taken during the month of November is referred to this species, though with some doubt. It comes from Chapada, Brazil (H. H. Smith).

Genus *OROCHARIS* Uhler.

*Orocharis* UHLER, Proc. Ent. Soc. Philad., II (1864), p. 544; SAUSSURE, Miss. Mex., Orth. (1874), p. 492; Mém. Soc. Genève, XXV (1878), p. 609; Biol. Cent.-Amer., Orth., I (1897), p. 269; BLATCHLEY, Proc. Indiana Acad. Sci., 1891, pp. 128, 139.

Like the preceding genus, *Orocharis* is confined to America, and has about the same distribution northward. To the southward it reaches well into Argentina. About two dozen species have been described. They differ materially from *Hapithus* in their more elongate and slender form, reminding one of the representatives of the genus *Metrypa*, from the males of which they may be separated by the incomplete oblique veins of the elytra and from the females by the form of the apical valves of the ovipositor.

99. *Orocharis saulcyi* (Guerin).

*Platydictylus saulcyi* GUERIN, Icon. R. Anim., Ins. (1844), p. 330.

*Orocharis saulcyi* SAUSSURE, Miss. Mex., Orth. (1874), p. 498; KIRBY, Syn. Cat. Orth., II (1906), p. 98.

*Habitat*.—There is a single female specimen at hand bearing the labels "Jamaica, W. I." and "Carn. Mus. Acc. 2306."

Genus *APHONOMORPHUS* Rehn.

*Aphonomorphus* REHN, Ent. News, XIV (1903), p. 260; KIRBY, Syn. Cat. Orth. II, (1906), p. 105.

*Aphonus* SAUSSURE, (*non* Leconte), Miss. Mex., Orth. (1874), p. 509; Mém. Soc. Genève, XXV (1878), p. 656; Biol. Cent.-Amer., Orth., I (1897), p. 280.

*Aphonogryllus* REHN (*nec* Perkins), Can. Ent. XXXIII (1901), p. 272.

*Eneoptera* DE HAAN (*nec* Burmeister), TEMMINCK, Verhandel. Orth. (1842), p. 231; Walker, Cat. Derm. Salt. B. M., I (1869), p. 66.

The insects, which are referred to the present genus, are distributed over the tropical portions of America, Africa, and the Oriental Region. The various species have a general resemblance one to another, but may be separated by such characters as size, color, and the form of the last ventral segment of the male abdomen, which latter is greatly developed into a scoop-like or spade-like prolongation. Upward of a dozen species have already been recognized in Central and South American countries, and now three others are added. The following table will aid in separating the American forms.

SYNOPSIS OF TROPICAL AMERICAN SPECIES OF APHONOMORPHUS.

- A. Auditory opening of the anterior tibiæ, oblong or elliptical.
  - b. Last joint of the maxillary palpi hatchet-shaped, usually with one side more expanded than the other, the apex often obliquely truncated. Eyes very prominent.
  - c. Ocelli of moderate size. Apex of the vertex concolorous (17 to 23 mm. in length).
    - d. Smaller (17 mm. in length), body not depressed. Posterior metatarsus armed with normal teeth or spines [Guiana and Brazil].  
*mutus* Saussure.
    - dd. Larger (22-23 mm.); the posterior metatarsus armed with large spines or teeth.
      - e. Posterior margin of the pronotum decidedly angulate at its middle. [French Guiana].....*variegatus* Chopard.
      - ee. Posterior margin of the pronotum broadly rounded at its middle.
        - f. Cinereous punctulate with fuscous. Median vein five-branched [Bolivia].....*silens* Saussure.
        - ff. General color rufo-testaceous. Median vein of the tegmina seven-branched. [French Guiana].....*major* Chopard.
    - cc. Ocelli very large, the middle one transverse. Apex of the vertex and of the front above yellow [Mexico].....*flavifrons* Saussure.
  - bb. Last joint of the maxillary palpi funnel-shaped, equally expanded on both sides of the middle, the apex not decidedly obliquely truncated. Eyes variable.
    - c. Tegmina, body, and legs varied with fuscous spots, patches, and lines.
      - d. Body moderately graceful, subcylindrical, not depressed. Head above and the pronotum marked with castaneous.
        - e. Hind tibiæ rather sparsely spined externally, internally five-spined [Colombia].....*timidus* Saussure.
        - ee. Hind tibiæ more numerous spined, externally seven-, internally nine-spined. [Bolivia].....*conspersus* sp. nov.
      - dd. Body not especially slender, somewhat depressed. Head above and the pronotum not prominently marked with castaneous or brown.

- e.* General color griseous. Discoidal vein of the tegmina alone spotted with black. [French Guiana] ..... *griseus* Chopard.
- ee.* General color fusco-testaceous. The tegmina throughout punctured or conspersed with fuscous. [Peru, Brazil] *telskii* Chopard.
- cc.* Tegmina body and legs not conspersed with fuscous.
- d.* Size smaller (17-18 mm.). General color ochraceo-testaceous, body weakly pubescent. [Guiana]..... *testaceus* Chopard.
- dd.* Size larger (19-20 mm.). General color ferruginous.
- e.* Tegmina provided with five prominent oblique ferruginous bands which follow the oblique veins. Wings lengthily caudate. [Bolivia]..... *obliquus* sp. nov.
- ee.* Tegmina without the oblique color-bands; wings not lengthily caudate. [Nicaragua]..... *diversus* Walker.
- AA.* Auditory opening of the anterior tibiae narrow, cleft-like.
- b.* Size larger (length of body 18 mm.).
- c.* Tegmina and wings very long, general color fulvo-testaceous [Peru]. *peruvianus* Saussure.
- cc.* Tegmina and wings shorter, the latter but little longer than the former. General color pale testaceous; the abdomen fuscous. [Brazil] *lividus* Burmeister.
- bb.* Size smaller (length about 13 mm.). Brunneo-testaceous, the abdomen dark fuscous. Humeral angle of the tegmina and pronotum vittate with flavous, bordered below by fuscous. [Brazil, Bolivia]. *hapitheformis* sp. nov.

#### 100. *Aphonomorphus mutus* (Saussure).

*Aphonus mutus* SAUSSURE, Miss. Mex., Orth. (1874), p. 510.

*Aphonomorphus mutus* KIRBY, Syn. Cat. Orth., II (1906), p. 106.

*Habitat.*—Three specimens are referred to this species. They are one male, one female from Rio de Janeiro, taken during October, and a female from Chapada, Brazil, also collected during the same month (H. H. Smith).

#### 101. *Aphonomorphus silens* (Saussure).

*Aphonus silens* SAUSSURE, Mém. Soc. Genève, XXV (1878), p. 665.

*Aphonomorphus silens* KIRBY, Syn. Cat. Orth., II (1906), p. 106.

*Habitat.*—There is a single male specimen of this species among the insects collected in the Province del Sara, Bolivia, at an elevation of 350 meters above sea-level. It was taken in December, 1912, by J. Steinbach. Carnegie Mus. Accession 5058.

#### 102. *Aphonomorphus conspersus* sp. nov.

A large but comparatively slender insect with the subgenital plate fashioned something like that of *A. major* Chopard. Strongly hirsute.



General color pale cinereo-testaceous sparsely conspersed on the pronotum, the humeral angle of the tegmina, and the hind femora with dark brown or fuscous spots.

Head a little broader than the anterior margin of the pronotum, gently depressed, the rostrum squarely truncate in front; eyes large and prominent; ocelli very large, almost touching one another. Apical joint of the maxillary palpi broadly funnel-shaped. Pronotum nearly as long as its basal width, the anterior margin shallowly but roundly emarginate, the posterior margin strongly sinuose. Tegmina narrow, extending well beyond the tip of the abdomen, the median vein eight-branched. Wings lengthily caudate. Anterior and middle legs rather robust, the front tibiae somewhat inflated and provided internally with a large oblong foramen. Hind femora graceful. Last ventral segment, or subgenital plate, fully twice as long as broad, longitudinally channeled at middle, the apex deeply and triangularly fissured, the two lobes evenly narrowed and rounded at their apex. Hind tibiae very irregularly spined, not normal in this specimen. Posterior metatarsus externally three-spined, internally one-spined, the apical spines very large and robust.

Length of body, ♂, 21 mm., including elytra, 25 mm., including wings, 30 mm., of tegmina, 21 mm., of pronotum, 3 mm., width 3.75 mm., length of hind femora, 13 mm.

*Habitat*.—The type, and only specimen, comes from "Sta. Cruz. de la Sierra, Bolivia," where it was taken at an elevation of 450 meters above sea-level by J. Steinbach. Carnegie Accession No. 4546.

### 103. *Aphonomorphus obliquus* sp. nov.

Related to *A. major*, but decidedly smaller, and less robust in form. A rufo-testaceous insect, with four prominently oblique rufous bands on the dorsal field of the tegmina. Body hirsute, in part also sericeous.

Head moderately large, a little wider than the front edge of the pronotum, depressed between the eyes, which are fairly prominent; ocelli large, elliptical, almost touching, and arranged in an arcuate row between the inner angles of the eyes. Pronotum transverse, strongly hirsute, the anterior end widely emarginate in front, behind roundly produced at middle, lateral lobes high, the lower margin rounded. Tegmina of moderate width, reaching beyond the apex of the abdomen and the tips of the hind femora, the veins rather numer-

ous and ferruginous, prominent, the cross-veins arranged in such a manner as to form four series of diagonal ones which give to these members the appearance of being crossed by that many oblique ferruginous bands, the median vein seven- or eight-branched; wings caudate, their apical field somewhat infuscated. Hind femora slender, unicolorous; hind tibiae externally six-, internally eight-spined; posterior metatarsus one- to two-spined, anterior and middle legs rather slender, the front tibiae a little swollen and perforated internally by an elliptical foramen. Subgenital plate elongate, the sides parallel, longitudinally and broadly canaliculate beyond the middle, the apex widely and shallowly emarginate. Cerci rather robust, curved, and about the length of the hind femora.

Length of body, ♂, 20 mm., to tip of tegmina, 22.5 mm., to tip of wings, 26 mm., of pronotum, 2.9 mm., width, 4 mm., length of hind femora, 11 mm.

*Habitat*.—The only specimen at hand, the type, comes from Santa Cruz de la Sierra, Bolivia, where it was collected by J. Steinbach at an elevation of 450 meters above sea-level. Carnegie Museum Accession No. 4546.

#### 104. *Aphonomorphus hapitheformis* sp. nov.

Body somewhat hirsute and sericeous. Of medium size, but comparatively robust, and having a rather strong resemblance to a fully winged female *Hapithes*. Bruneo-testaceous with a narrow testaceous line along each side of the pronotum and the humeral angles of the tegmina, and bordered below by dark brown, inclining to piceous. Abdomen piceous or black. Base of the tegmina conspicuously marked with a black spot.

Head of moderate size, semiglobose, the occiput tumid, gently depressed just back of, and between, the lateral ocelli. These medium in size, elliptical; rostrum rather prominent between the antennae, of about the same width as the greatest diameter of the basal joint of the latter. Pronotum transverse, the humeral angles rounded, broadly emarginate in front, behind sinuose, the middle apex subangulate. Tegmina rather broad, a trifle longer than the abdomen, regularly veined in the female, a little irregularly so in the male, mediastine vein five-branched. Wings briefly caudate, slightly infuscated apically. Anterior and middle femora robust, the front tibiae

but little inflated, the auditory opening small and narrow, fusiform or subfusiform. Hind femora robust and rather long for the size of the insect. Last ventral segment of the male abdomen elongate, evenly tapering apically, scarcely canaliculate, its apex roundly docked. Hind tibiae five-spined on both sides; the posterior metatarsus one- to two-spined, or toothed.

Length of body, ♂, 12 mm., ♀, 13.5 mm.; of pronotum, ♂, 2.15 mm., ♀, 2.65 mm.; width, ♂, 3.25 mm., ♀, 3.4 mm.; length of tegmina, ♂, 12.5 mm., ♀, 13.5 mm.; of wings, ♂, 15 mm., ♀, 16 mm.; of hind femora, ♂, 12 mm., ♀, 13 mm.; of ovipositor, 9.5 mm.

*Habitat*.—Seven males and six females. These insects were taken at Chapada and Corumbá, Brazil, during the months of March to November (H. H. Smith) and Puerto Suarez, Bolivia, Nov.—Jan., 1908–1909 (J. Steinbach). The types, male and female, are deposited in the Carnegie Museum.